FEBRUARY 1958

RAILWAY TRACK and STRUCTURES

A Simmons-Boardman TIME-SAVER Publication

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-ON RAIL ENDS, RAIL JOINTS, FROGS AND SWITCHES

with— NATIONAL RAILWAY SPRING WASHERS

-on the job!

Powerful NATIONAL Spring Washers have demonstrated their ability to reduce maintenance costs. The reserve power, designed into these service-proven spring washers, absorbs shocks and assures constant bolt tension.

A COMPLETE LINE OF RAILWAY SPRING WASHERS

The NATIONAL LOCK WASHER COMPANY

Serving Industry Since 1886 — NEWARK 5, NEW JERSEY, U.S.A.

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The Kershaw CRIB ADZE

The Kershaw RAIL RE-LAYER

For production increases in your rail re-laying gangs, try the Kershaw Crib-Adze and the Kershaw Rail Re-Layer.

The revolutionary Kershaw Crib-Adze, which operates on either right or left hand rail, can double your adzing production. Operated by only one man, the Kershaw Crib-Adze cribs between the ties, adzes the ties in the same plane, and then adds preservant to the adzed ties, all in one operation.

It does the work formerly requiring one Kribber, three adzing machines, one tie brush and one creosoter.

The Kershaw Rail Re-Layer then re-lays rails, using only one operator and one helper, at a production increase of from 50 to 100 per cent. The machine is mounted on a crawler tractor for quick removal from the track, the boom at the rear of the Kershaw Rail Re-Layer may be used to set off other machines.

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MONTGOMERY (K) **ALABAMA**

You can use Hook Twin tie plates so many ways!

You can fit a pair of Bethlehem Hook Twin tie plates under most any track structure, whether it be a frog, crossing, guard rail, or rails approaching a frog or switch. They offer substantial economies by eliminating the need for a variety of special tie plates. And you'll find that Hook Twins anchor more securely than spikes alone.

Each steel plate contains an integral forged hook especially designed to make a snug fit with the base of the frog or rail. Thus, using two plates to each tie, it is a simple matter to position the plates for positive anchoring.

The hook is larger and stronger than a standard spike head, providing greater bearing on the rail base. Track action, moreover, is transmitted through the hook to the full surface of the plate, thus spreading thrusts over a relatively broad area of the tie. This protects the tie and minimizes the "pull" on the spikes which hold the tie plate in place.

Because of the adaptability of Hook Twin Tie Plates, most railroads find they need stock these plates in only three of four lengths, an inventory advantage which storekeepers can appreciate. Folder 642 contains full details on lengths, widths and thicknesses available, along with other pertinent information. You are welcome to a copy; just get in touch with the Bethlehem office nearest you.

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BETHLEHEM STEEL

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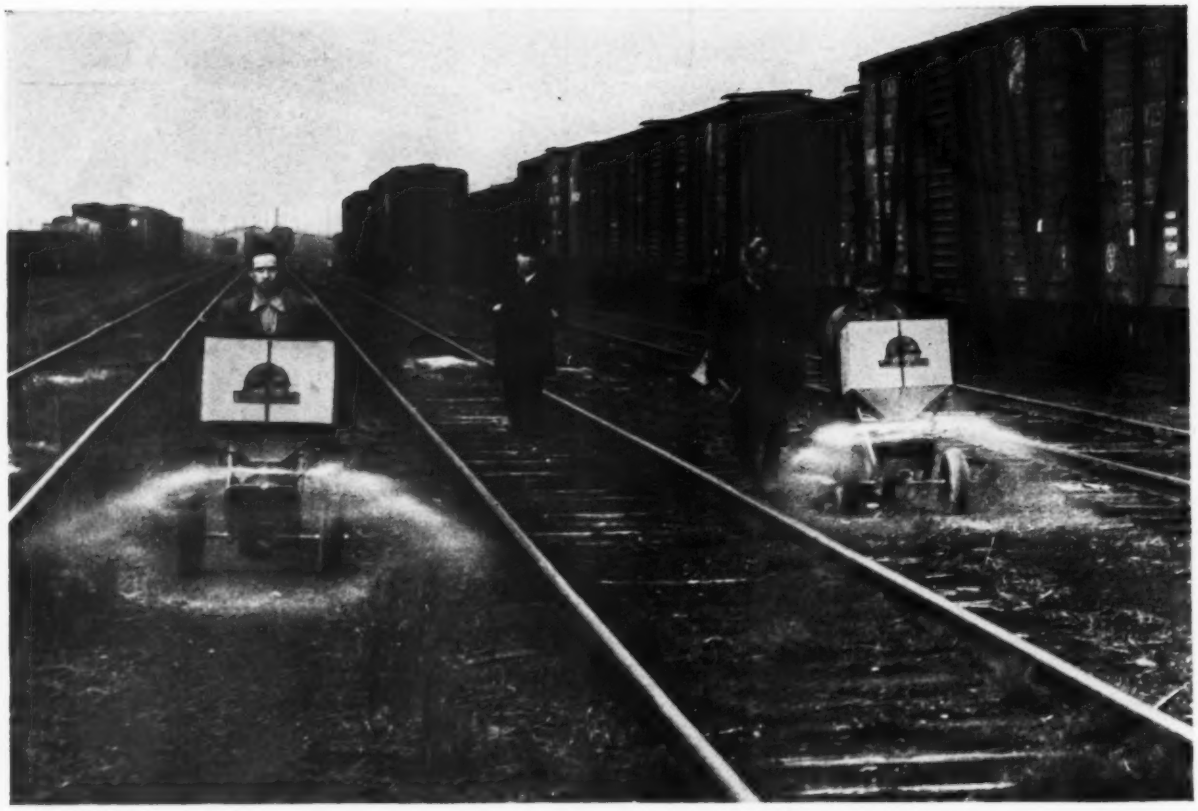

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Nalco H-174 is effective whenever you apply it, but you can get full advantage from this powerful herbicide by spreading a single dosage about 2 weeks *before* weeds begin to emerge. H-174 will keep them down all year long, eliminating unsightly and inflammable weed debris, preventing re-growth and mid-season seeding.

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TRACK and STRUCTURES

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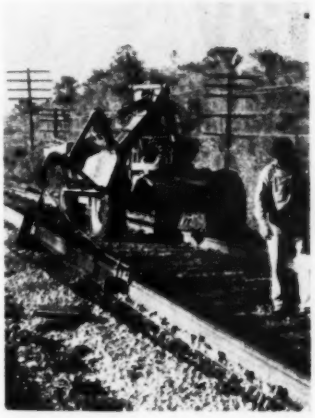

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DON'T MISS . . .

A high degree of mechanization is needed on the T&NO where 1,100-ft strings of continuous welded rail are laid between trains. The smoothly-functioning organization works with clock-like precision to avoid train delays. Read about it . . .

. . . in the March issue

NEW **P-S** *POWER BALLASTER*

features versatile split head, high capacity-high quality tamping and simplified design

NEW **P-S** *TIE SPACER*

for the first time . . . mechanized tie spacing for ALL conditions with exceptional economy

For faster, more economical maintenance of way

AND **P-S** *CRIBBER and CLEANER*

TRACK EQUIPMENT DEPARTMENT

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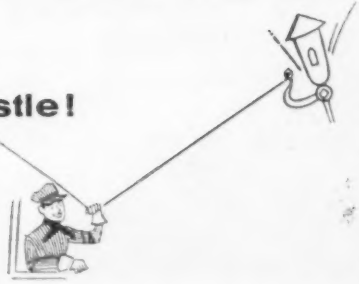
WEEDS GONE!

clean as a whistle!



Read how you can get longer-lasting weed control *at lower cost* with amazing UROX Weed Killer

It's a fact! Urox is so effective—so long-lasting—that single applications have given outstanding control *for as long as 12 months* on a wide range of annual and perennial grasses and broad-leafed weeds.

And results "carry over"! Light "booster" doses keep most areas weed-free from season to season. This means cumulative savings, because herbicidal action can be continued year after year with light follow-up treatments . . . or by applying standard doses at longer time intervals.

Yes, Urox is easy to use! Comes in free-flowing granular form. No water needed. Can be applied with inexpensive equipment or in shaker cans (for small clean-up jobs). And Urox is non-flammable when used as directed . . . has very low toxicity to animals.

All over the U. S., cost-conscious maintenance-of-way experts are using and praising Urox. Isn't it high time *you* investigated this sensational new weed killer?

DISCOVER HOW YOU CAN GET CLEAN-AS-A-WHISTLE WEED CONTROL AND SAVE MONEY, TOO!

MAIL COUPON NOW!

Weed Killer Department

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ALLIED CHEMICAL & DYE CORPORATION
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☐ Please send free folder giving complete information on new Urox herbicide.
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RT-2

Two new TRUE TEMPER® machines

INSTALL ANCHORS FASTER, MORE ACCURATELY THAN EVER

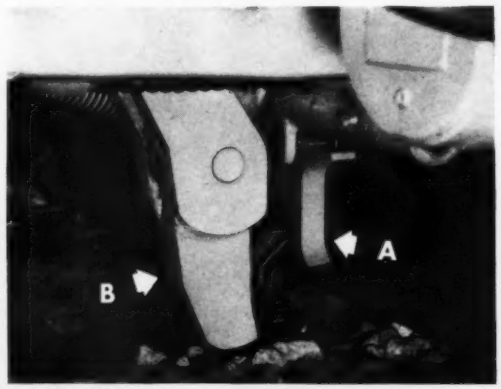
Hydraulic machine makes anchor installation almost automatic

An entirely new machine that installs rail anchors more accurately than ever before has just been completed by True Temper engineers.

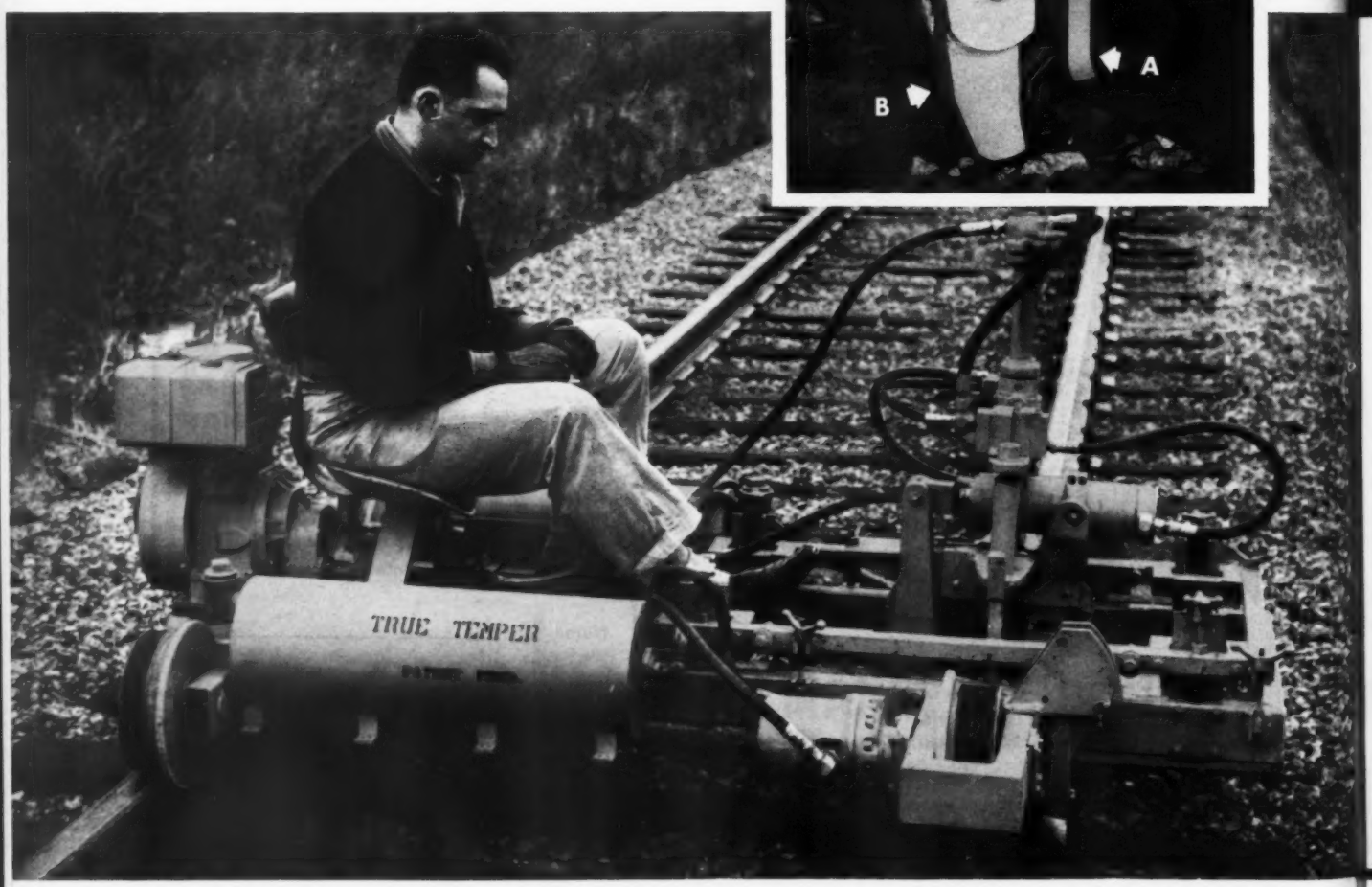
Using hydraulic power, it positions each anchor snugly against the tie and installs it with firm, positive bearing against the tie. This makes every anchor a working anchor — there are no "loafers," no wasted anchors.

In addition, True Temper's new machine uses smooth hydraulic force to "squeeze" each anchor onto the rail uniformly and accurately. This keeps all of the strength and "spring" in the anchor and permits it to be re-used many times with no appreciable loss in tension and holding power.

True Temper's hydraulic machine is self-propelled, will work on grades (including 3% hump grades), has automatic braking, and is insulated between rails. It is bi-directional, and can box ties as it goes. Its self-centering carriage positions itself over each anchor automatically, and does not disturb or "roll" the rail when the anchor is applied. Adjustable gauge wheels keep the machine square to the rail. Preliminary tests indicate that it can apply from 500 to 700 anchors an hour.



Positioning arm (A) locates machine precisely over anchor, then holds compression against side of anchor during application, to seat it firmly against tie. Hydraulic arm (B) "squeezes" anchor onto rail. Built-in device braces other side of rail to prevent disturbing gauge.



True Temper's new hydraulic rail anchor machine is easily operated by one man. A turn-around jack and setoff wheels will be provided.

One-man operation and retractable setoff wheels make the pneumatic anchor driving machine an efficient, fast-working unit. Powerful ram installs anchors with a sure, uniform force.

Pneumatic machine is speedy anchor driver

Already proved on several leading railroads, True Temper's pneumatic rail anchor machine makes big savings in time and costs because of its fast operation. And its mechanical precision means uniform application to assure that each anchor works full time.

Make full use of BULLDOG anchor's unique two-way holding power

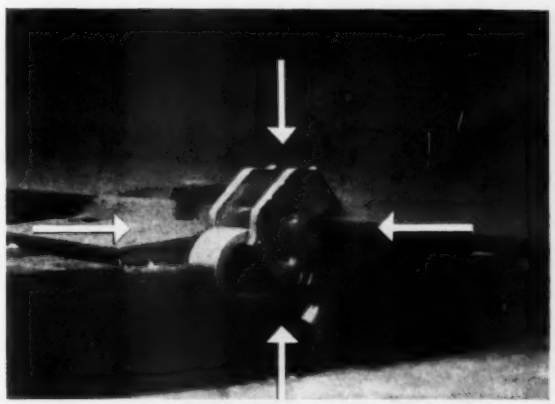
True Temper's BULLDOG anchor grips the rail base with both horizontal and vertical force to produce a two-way grip that insures positive anticreep protection. Also, because of the integral design of the BULLDOG's two factory-assembled elements, the vertical force of the clamp sustains and maintains the horizontal force of the spring.

For the full story on how these new machines make full use of all this holding power, contact your True Temper representative, or write True Temper, Railway Appliances Division, 1623 Euclid Avenue, Cleveland 15, Ohio. No obligation, of course.

SEE BOTH MACHINES IN CHICAGO

True Temper will display both the hydraulic and the pneumatic rail anchor machines at the

National Railway Appliances Association Exhibit
The Coliseum, Chicago • March 10 through 13, 1958
Booth Nos. 49, 50, 51



OTHER TRUE TEMPER RAILWAY PRODUCTS: BULLDOG Ballast Forks, Weed Cutters • BULLDOG Shovels • BULLDOG Safety Rail Forks, Hammers, Sledges • BULLDOG Scythes

TRUE TEMPER BULLDOG RAIL ANCHORS — YOU CAN LOOK TO TT FOR LEADERSHIP

ASSOCIATION OF AMERICAN RAILROADS—William M. Keller, assistant vice-president in the Operation and Maintenance department, has been elected vice-president—research to direct AAR research activities relating to the engineering, mechanical and electrical fields.

ATLANTIC COAST LINE—Robert L. Groover, formerly chief engineer, who has been serving as assistant general manager since March 1957, has retired after more than 42 years of service with the ACL. **William A. Spell,** engineer maintenance of way of the Western division, with headquarters at Atlanta, Ga., has retired after more than 51 years with the ACL and predecessor companies.

A native of Aurora, Tex., Mr. Spell began his railroad career with the St. Louis-San Francisco in January 1902. He started work with the Atlanta, Birmingham & Coast in August 1906 as an instrumentman, later serving as draftsman. He was appointed principal assistant engineer at Atlanta in 1913, engineer maintenance of way in 1924, chief engineer in 1932, and was named engineer maintenance of way in 1946 when the AB&C was absorbed by the Atlantic Coast Line.

CANADIAN NATIONAL—J. F. Davidson has been appointed assistant to the chief engineer at Montreal. **R. F. Weir,** assistant bridge engineer on the Central Region, has been promoted to bridge engineer, Atlantic Region, Moncton, N.M., succeeding **R. G. Maughan.** Mr. Maughan has been appointed assistant to chief engineer of the Grand Trunk Western at Detroit, Mich.

James L. Brenner, assistant engineer on the CNR, has been promoted to division engineer at Dauphin, Man., succeeding **A. D. Shackleford,** who has retired.

LACKAWANNA—A. F. Grycesky, inspector of maintenance of way, with headquarters at Scranton, Pa., has been promoted to division engineer of the Morris and Essex division. A graduate of Union College at Schenectady, N. Y., Mr. Grycesky came to the Lackawanna as a transitman at Buffalo in October 1950. The following year, he was promoted to draftsman, and in 1953 was transferred to Scranton. In 1954, he was made assistant engineer, being transferred to Binghamton, N. Y., in 1956. He was promoted to inspector of maintenance of way in April 1957.

LEHIGH VALLEY—Carl W. Baker, superintendent of the New York division, and formerly division engineer at Jersey City, N. J., has been elected vice-president—operations and maintenance, succeeding **James J. Swift.**

NEW YORK CENTRAL—J. A. Hawley, assistant division engineer at Indianapolis, Ind., has been promoted to assistant district engineer of structures at Indianapolis, succeeding **J. M. Gilmore.**

NICKEL PLATE—George F. Nigh, assistant division engineer of the Lake Erie and Western district, has been promoted to division engineer of the Clover Leaf district at Frankfort, Ind., succeeding **Edward Green** who has resigned.

PENNSYLVANIA—R. T. Meyer has been named assistant supervisor of track, Northwestern region, at South Chicago.

ROCK ISLAND—G. H. Bond has been appointed chief scale inspector and supervisor of painting at Kansas City, Kan.

SANTA FE—R. A. Van Ness, bridge engineer, system, at Chicago, will retire March 1.

SEABOARD AIR LINE—T. B. Hutcheson, assistant chief engineer at Norfolk, Va., has been promoted to chief engineer, succeeding **W. D. Simpson,** who has retired. **John T. Ward,** principal assistant engineer, has been named assistant chief engineer, succeeding Mr. Hutcheson. **John L. McBride** has been appointed principal assistant engineer to succeed Mr. Ward.

SOO LINE—Paul J. Isakson, division engineer at Thief River Falls, Minn., has been transferred to Enderlin, N. D., succeeding **R. C. Postels,** who has been named assistant chief engineer (*RT&S,* Jan., p. 10). **Warren B. Peterson** has been named division engineer at Thief River Falls, succeeding Mr. Isakson.

SOUTHERN PACIFIC—Ethan J. G. Allen, has been promoted from valuation engineer to valuation officer, succeeding **Chester R. Tinkler,** who has retired after 36 years of service. **Jack E. Hebbron** was named valuation engineer, and **Leo Gunderson** was appointed assistant valuation engineer.

Biographical briefs

Cyril I. Biegler, 34, who was recently promoted to district engineer on the Canadian National at Toronto, Ont. (*RT&S,* Sept., p. 26), graduated from McGill University and joined the CNR working as a rodman and instrumentman on the St. Lawrence division at Montreal during summers while he was attending school. In April 1950 he was named instrumentman on the Montreal terminals and the St. Lawrence division and in January 1952 was promoted to assistant engineer in the chief engineer's office at Toronto, Ont. In March 1955 he was named division engineer at London and in June 1956 he became an operations trainee on the Central Region at Toronto. In March 1957 he was appointed acting district engineer at Toronto—the position he held at the time of his recent promotion.

A. J. Wilson, 64, who was recently promoted to assistant chief engineer of the Union Railroad at East Pittsburgh, Pa. (*RT&S,* Oct., p. 26), graduated from Pennsylvania State University and began railroading with the Union in June 1915 as a draftsman at East Pittsburgh, Pa. He subsequently served as assistant engineer at East Pittsburgh, master carpenter at Bessemer, and supervisor, general maintenance, at Bessemer until 1940 when he was appointed general maintenance engineer at Duquesne. In 1947 he was promoted to engineer of structures at East Pittsburgh and in 1953 he was named assistant to the chief engineer—the position he held at the time of his recent promotion.

George S. Forbes, who was recently named assistant to manager—work equipment on the Canadian National at Montreal, Que. (*RT&S,* Nov., p. 12), began

(*Continued on page* 64)

G. F. Nigh
NKP

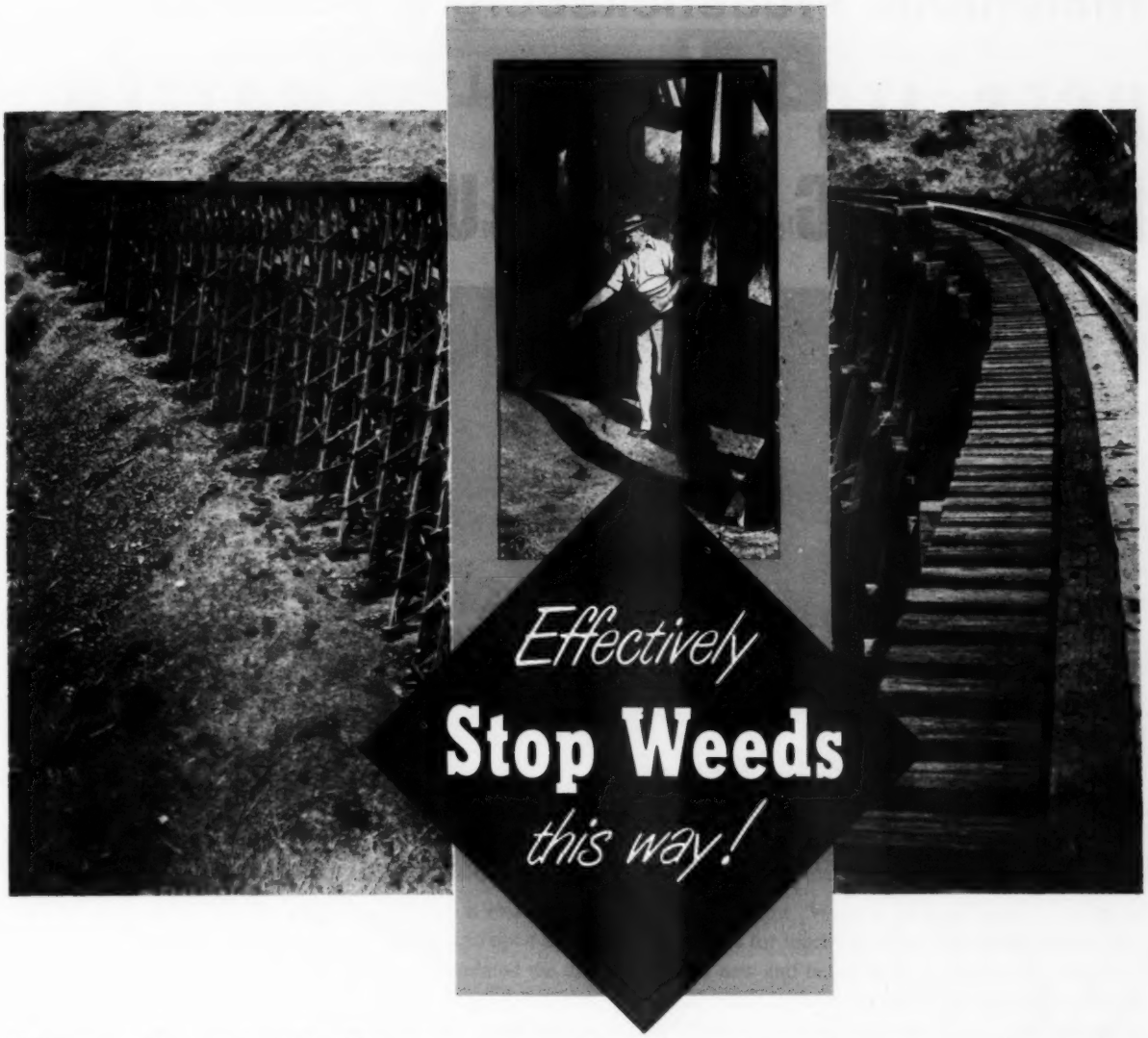
W. D. Simpson
SAL

T. B. Hutcheson
SAL

J. T. Ward
SAL

Cyril I. Biegler
CNR

A. J. Wilson
Union



Your best defense against weeds on tough terrain... **Concentrated BORASCU®**

As a weed killer for areas where bare ground is essential to safety from wildfire, you'll want to do as most roads do... choose Concentrated Borascu. This weed killer is the most convenient sort... there is nothing to mix; no water to haul. It is readily applied wherever a man can walk... all he needs is a pail and a few sacks of Borascu. Compare this to weed-cutting and figure the savings.

Part of the savings will, of course, be due to the long-lasting results... from one to two years is not uncommon. And this material is safe! It is not poisonous, flammable, or corrosive to ferrous metals. In addition, the cost is attractively low.

Investigate this dependable weed-and-grass killer and the savings it affords. Write for descriptive literature. Or, if you would like to see actual results on *your* road under your conditions, we'll be happy to make a demonstration without obligation.

AGRICULTURAL SALES DEPARTMENT

United States Borax & Chemical Corporation

PACIFIC COAST BORAX COMPANY DIVISION

630 SHATTO PLACE, LOS ANGELES 5, CALIFORNIA

MANUFACTURERS OF FAMOUS "20 MULE TEAM" PACKAGE PRODUCTS

Richmond, Fredericksburg & Potomac

USES ITS NO. 112 TO BATTEN DOWN AGAINST HURRICANES

This versatile Caterpillar No. 112 Motor Grader is building a defense against hurricane damage for the Richmond, Fredericksburg & Potomac RR. North of Ashland, Va., it is cutting banks and maintaining haul roads as the railroad restores damaged roadbed and stabilizes banks.

The job calls for moving 110,000 cu. yd. of gravel and clay. The grader is a key piece of equipment. For it not only does its own specialized job (cutting banks), but by maintaining haul roads it helps the railroad get the highest possible production from its other Caterpillar-built equipment.

This kind of versatility makes the hard-working rig invaluable for all kinds of off-track jobs. Besides shaping embankments and maintaining roads, it will level irregular fill, control weeds and brush, police yards, clean side ditches and even clear snow.

And it works efficiently and economically. For instance, it can burn low-cost fuels such as No. 2 furnace oil—and do it *without fouling!* Positive acting controls and wide range of blade positions increase operator efficiency. So do these recent improvements: adjustable seat and back rest and taller cab with better ventilation and 31% more window area. Newly designed front axle components provide extra strength, longer life.

In addition, each CAT* Motor Grader is backed by your Caterpillar Dealer who specializes in fast, efficient service and maintains a complete inventory of parts for you. He'll be happy to demonstrate his machines on one of your own jobs. Just call him.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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WANTED—
THE HARD WORK

Dear reader:

RAILWAY
TRACK and STRUCTURES

How to profit from a business slump

The fact that the economy is undergoing a period of recession is accepted. The fact that the general let-down is having an adverse affect on railroad traffic and earnings is obvious. And, as usual, this situation is reflected by cut-backs in M/W budgets.

This pattern of events has happened before, many times. But, in so far as M/W work is concerned, there's a difference in the present situation. We can get at the significance of this difference by setting up two hypothetical situations and noting what happens under each of them when a recession occurs.

Hypothesis No. 1—Wage rates are very low. When business declines wages remain the same or may even go down. Hence, when maintenance allotments are reduced the general practice is to perform the smaller amount of work with the same methods currently in use. Under such conditions there isn't any great incentive to introduce labor-saving methods.

Hypothesis No. 2—Wage rates are now at sharply higher levels. Each time they have gone up labor-saving measures have become that much more profitable. The result; increased mechanization. Now a business decline occurs but wages continue to go up. This places a premium on efforts to save labor. If allotments are cut, efforts to mechanize are redoubled to make the money go as far as possible.

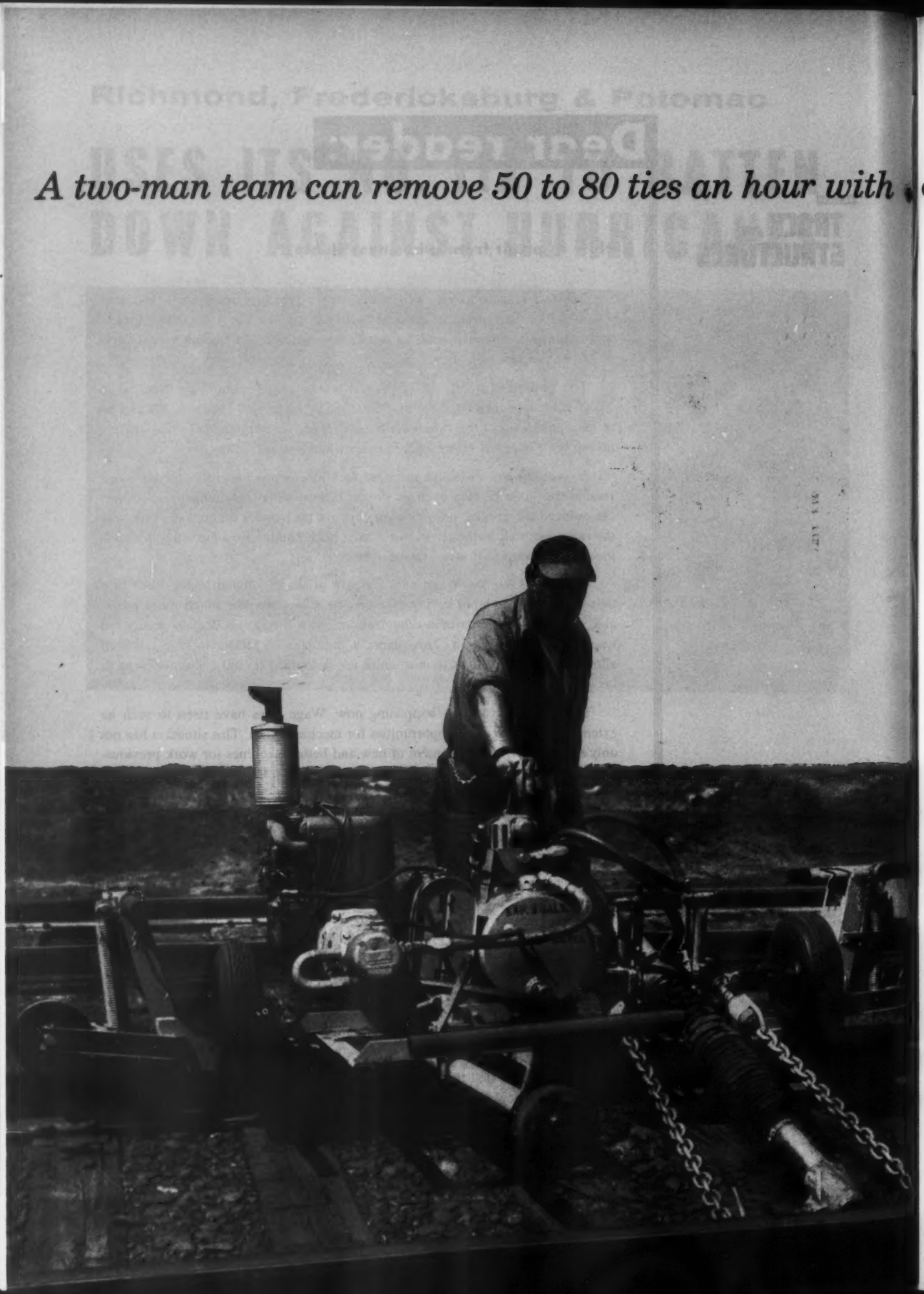
This is exactly what is happening now. Wage rates have risen to such an extent as to open up new opportunities for mechanization. This situation has not only stimulated the development of new and better machines for work previously mechanized but also the introduction of equipment for work not previously done with machinery. The sudden rash of machines for applying rail anchors, described elsewhere in this issue, is an example.

Now let's look at what is happening during the present business slump. Reports from railroads indicate that their maintenance activities during the early months of 1958 anyway will be somewhat curtailed. At the same time, they are also reporting, paradoxically, that overall they will continue to buy work equipment at a relatively high rate.

The encouraging aspect of this situation is that the railroads are showing a willingness to spend money for labor-saving equipment at a time when dollars are not easy to come by. There are two ways to save money. One is not to do the work. The other is to do the work but in the most economical manner possible. Could it be that there is a gradual shift in management thinking to the latter concept? Stranger things have happened!

It thus appears that the present period of adversity is being used by the railroads to forge new and more efficient maintenance methods. In fact, it is apparent that a similar process is underway throughout all facets of the railroad industry. Inefficient operations, wasteful practices and regulative inequities are being attacked on a broad front. Hence, when the uptrend in the business cycle is resumed we can visualize the possibility that the fundamental position of the railroads will be stronger than ever before. MHD

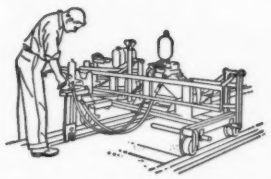
A two-man team can remove 50 to 80 ties an hour with . . .



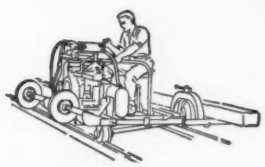
Fairmont

THE FAIRMONT W68 SERIES A HYDRAULIC TIE REMOVER (shown in actual operation at the left) cuts tie renewal and ballast costs to a fraction of what they would be with any other method. The W68 pushes ties out, without jacking track, at the rate of one or better a minute. A light surfacing may be made, but many renewals can be handled without need of track surfacing. The W68 is ideal in small 8- to 10-man gangs and works just as well in large, fully mechanized gangs. When working in traffic, it can be easily removed from the track in two or three minutes. Be sure to reduce your costs by including W68's in your tie renewal plans.

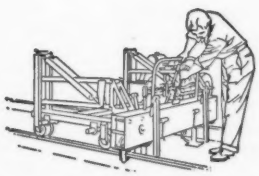
Other Tie Renewal Equipment by Fairmont



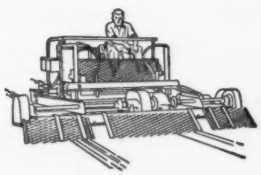
W84 SERIES B HYDRAULIC SPIKE PULLER is primarily for use in tie gangs. Light in weight, it features a ball-and-socket-mounted pull assembly. Will pull from either rail without change-over.



W90 SERIES A TIE HANDLER inserts or removes ties quickly and requires only two men for operation. Simple design and sound construction. Self-propelled. Two-way operation.



W86 SERIES A HYDRAULIC RAIL LIFTER features a spring-counterbalanced lifting arm, welded steel supporting frame and a direct-driven hydraulic pump. Two-man track removal.



W87 SERIES B TIE BED SCARIFIER with one operation can dig a tie bed a minute, to a controlled depth at right angles to rails. Assembly and drive are hydraulically operated.

W83 SERIES B TIE NIPPER (not illustrated) features a simple linkage and lever which guarantee positive opening and closing of hooks. The handle can be placed in three different positions.

FAIRMONT
RAILWAY MOTORS, INCORPORATED
FAIRMONT, MINNESOTA

MANUFACTURERS OF BALLAST MAINTENANCE CARS, DERRICK CARS, OIL SPRAY CARS, GROUTING OUTFITS, TIE RENEWAL EQUIPMENT, RAIL RENEWAL EQUIPMENT, WEED CONTROL EQUIPMENT, HY-RAIL CARS, TRACK MOTOR CARS, PUSH CARS AND TRAILERS.

Helps from Manufacturers

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information, write direct to the manufacturer.

WELDING. A new 48-page catalog on supplies and accessories for gas and arc welding is now available. Presented in this catalog, which contains over 100 illustrations, is information on ferrous and non-ferrous welding rods for oxyacetylene welding and Heliwelding, welding and brazing fluxes and their applications, aluminum welding fluxes, Aircosil silver brazing alloys, brazing alloys, Jackson and Airco protective equipment including goggles, glare protection spectacles, cap and goggle combinations, welding helmets and face shields, hard hats, headgear and pocket shields, leather welding gloves and many other accessories. The catalog is designated Form ADC 848B. (Write: *Air Reduction Sales Company, Dept. RTS, 150 E. 42nd Street, New York 17.*)

PIPING. An 8-page booklet, entitled "Wrought Iron O.D. Piping," has recently been made available documenting more than a score of typical commercial and industrial wrought iron pipe installations. ASTM specifications under which the manufacturer's pipe is made are contained in the booklet as are photo-micrographs showing the physical structure of the material. (Write: *A. M. Byers Company, Dept. C-3, RTS, Clark Building, Pittsburgh 22, Pa.*)

RETARDERS. A four-page, two-color brochure has recently been made available by the manufacturer discussing electro-pneumatic car retarders for industrial applications. The pamphlet contains photographs of retarder installations and discusses their advantages. (Write: *Union Switch & Signal Division of Westinghouse Air Brake Company, Dept. RTS, Pittsburgh 18, Pa.*)

REPLACEMENT PARTS. A new 8-page booklet, entitled "Can You Be Sure?", has recently been released explaining why the manufacturer's replacement parts are recommended for best performance and service life. The two-color booklet contains drawings and cutaways which show the individual characteristics of pistons, rings, pins and cylinder liners with emphasis on their physical and metallurgical design features. The booklet, designated Form No. DE760, is available in English, French, Spanish and Portuguese. (Write: *Caterpillar Tractor Company, Dept. RTS, Peoria, Ill.*)

TRACTOR ATTACHMENTS. A new booklet, designated Form No. DE754, and entitled "Attachments," has recently been released. The booklet, printed in two colors, lists many of the prime mover tools offered by the manufacturer for its equipment. Liberally illustrated, the booklet shows attachments for crawlers, wheel units, Traxcavators and motor graders. (Write: *Caterpillar Tractor Company, Dept. RTS, Peoria, Ill.*)

TIMBER PRESERVATION. A 16-page, 3-color booklet has recently been released entitled "Here's How to Double Expected Service Life of Timber Bridges and Trestles." The booklet discusses the necessity of timber trestle replacements, the background of in-place treating of timbers, bridge timber decay, materials and techniques of bridge treating, economics of in-place treatment, and bridge treatment program planning. The booklet is illustrated with on-the-job photographs and contains tables relating to decay and timber life expectancy. (Write: *Osmose Wood Preserving Company of America, Inc., Dept. RTS, 980 Ellicott Street, Buffalo 9, N. Y.*)

CHAINS. A four-page bulletin, designated DH-101, has recently been made available covering the properties and capabilities of ACCO registered sling chains. The booklet features a listing of the seven main points to consider when ordering sling chains and contains a chart giving the working load limits of 2-leg chains fashioned of X-Weld 125 or Endweldur 125 chain. (Write: *American Chain and Cable Company, Inc., Dept. RTS, 929 Connecticut Avenue, Bridgeport 2, Conn.*)

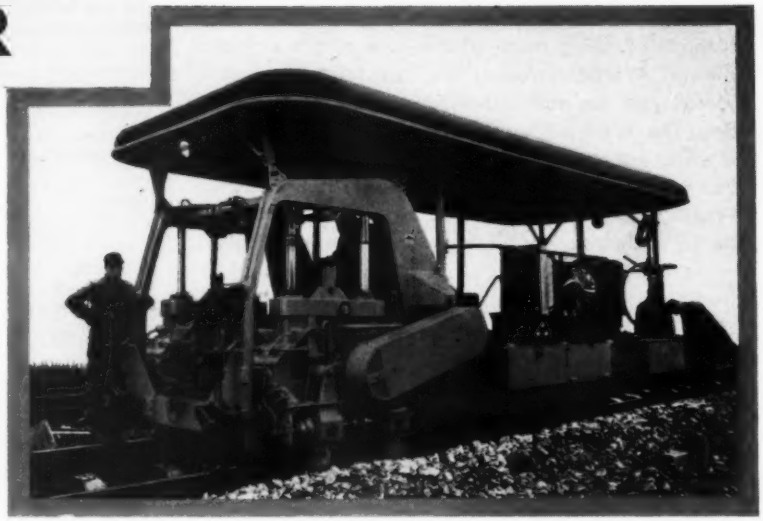
SAFETY HATS. A new four-page illustrated folder has been released, describing the manufacturer's new assortment of winter liners for protective hats. Included in the folder are illustrations and specific descriptions of each of the available models, with appropriate catalog designations for accurate order listings. (Write: *Mine Safety Appliances Company, Dept. RTS, 201 North Braddock Avenue, Pittsburgh 8, Pa.*)

PLASSER
High Capacity HYDRAULIC TAMPER

"One man tamps 1100 ft. an hour"

says Canadian M/W Engineer

". . . the total time to tamp 11 rails with 24 ties to panel was 22 minutes for one insertion . . . It would appear that the machine was capable of tamping 1100 feet of track (per hour) if given complete freedom to work. To date the track has stood up well."



The PLASSER VKR-01 HIGH CAPACITY HYDRAULIC TAMPER is the latest development in track maintenance, incorporating hydraulic drive and control. It assures highest performance, accuracy and simple handling, resulting in absolutely uniform compacting of ballast.

Tamping units consist of 16 units made of tough, wear-resistant steel which, through vibration and compression, work the ballast under the ties. It is especially effective in loosening fouled or cemented ballast beds. It works with minimum interruptions; a compressed-air elevating device moves it off-track in two minutes. Exceptionally quiet in operation.

8 ADVANTAGES

1. **Entire weight of machine rests on already-tamped track.**
2. **Each tool packs to full pre-set pressure independently of other tool pairs; results in uniform ballasting.**
3. **Automatically increases tamping pressure at joints and high rails at curves.**
4. **Adjustment for deep or ordinary tamping may be made while running.**
5. **Good "trackability"; rubber-cushioned axles damped vibration.**
6. **Easy, simplified push-button operation helps personnel efficiency.**
7. **Diesel-powered compressor; quiet operation.**
8. **One-man operation; exceptionally high performance.**

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PLASSER RAILWAY MACHINERY

News notes...

. . . a résumé of current events throughout the railroad world

Details of the railroads' plight are coming to light in Washington before a Senate subcommittee. The purpose is to get at the bottom of the "deteriorating railroad situation and its effect on the national transportation picture." First to be heard were AAR president Daniel P. Loomis and five railroad presidents, with some 20 others scheduled to be heard later. The five presidents were J. M. Symes, Pennsylvania, R. S. MacFarlane, Northern Pacific, H. A. DeButts, Southern, and A. E. Perlman, New York Central. Summed up, the testimony of these industry leaders constituted a call for a broad program of legislation aimed at freeing the railroads from excessive taxation and restrictive regulation. Informed opinion is that the railroads may get some tax relief, but that's all, at least right away.

•

The three-year wage agreement reached with railroad labor last year is proving a burden. "At the time," Rock Island President D. B. Jenks, commented recently, "it seemed about the best we could do . . . Looking back at this agreement in view of present business conditions, it doesn't look so good." The situation in brief: railroad business is down, but wages of railroad labor are continuing to go up.

•

"The Brotherhood of Maintenance of Way Employees has never suggested an annual wage," said President T. C. Carroll in a recent address. What the Brotherhood is "progressing" is the "theory that maintenance men should be guaranteed 52 weeks of work opportunity." Mr. Carroll wants the railroads to place the same emphasis on the budgeting of manpower as they do on the budgeting of dollars.

•

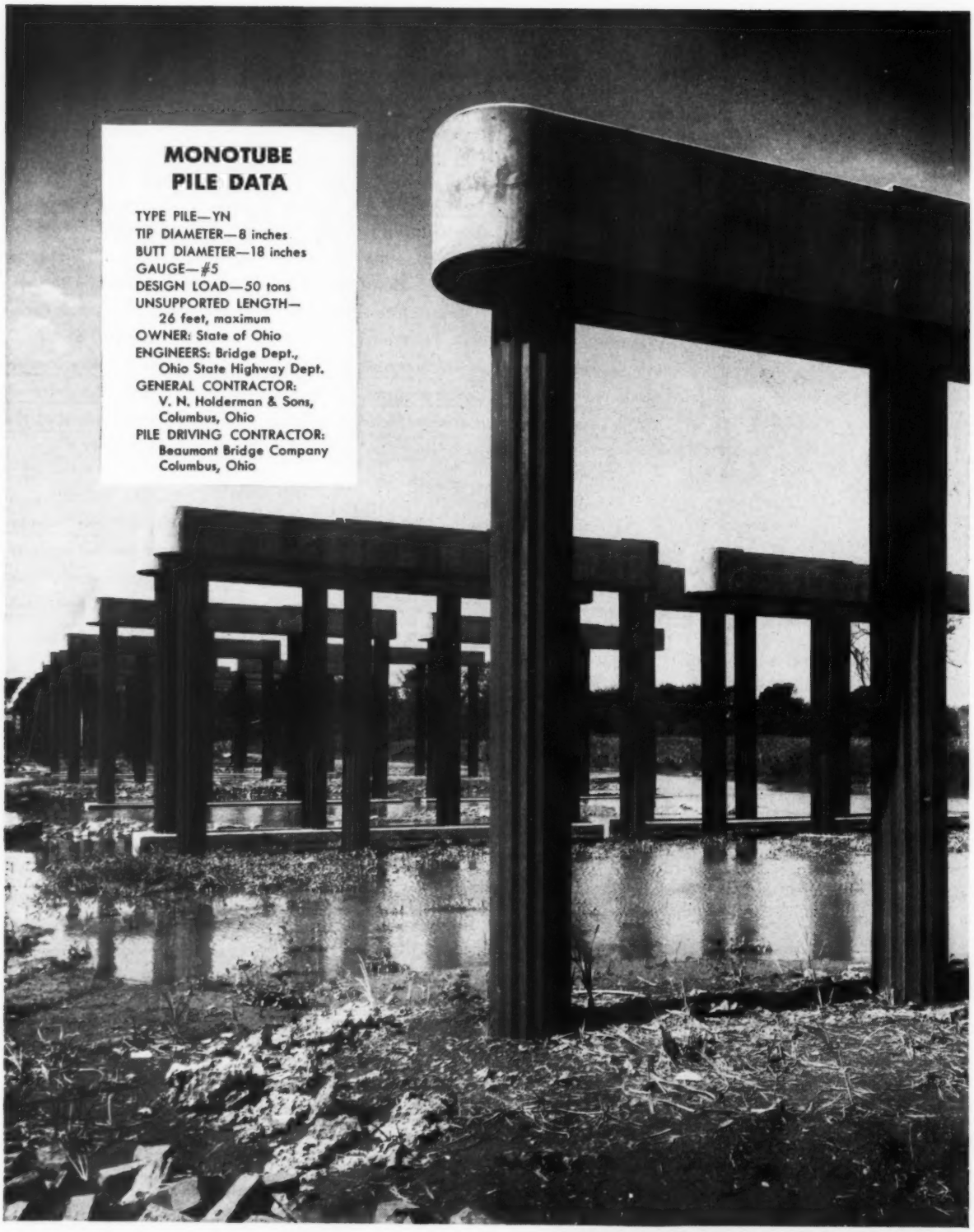
Detroit may use a monorail system to solve its transit problem. The Detroit Rapid Transit Commission has, or soon will, file recommendations for a 54-mile elevated structure which would cost an estimated $256 million to build. Behind the proposed recommendation is the conviction that mass public transportation has to be gotten off the ground to be effective. The proposed monorail system would have cars suspended from inverted L-shape structures based along the street curbing.

•

The New York Central has ended its contract with the Pullman Company for the operation of sleeping car services. Aimed at trimming passenger service costs, the move will become effective July 1. The railroad will assume the Pullman services, with car maintenance to be handled in its own passenger shops.

•

Carloadings of revenue freight in the first quarter of 1958 will be 3.8 per cent under loadings in the comparable 1957 quarter. The 13 regional Shippers Advisory Boards, which made this forecast, estimate that first quarter loadings of the 32 principal commodity groups will be approximately 6,266,087 cars, compared with 6,515,997 cars in the first three months of last year.



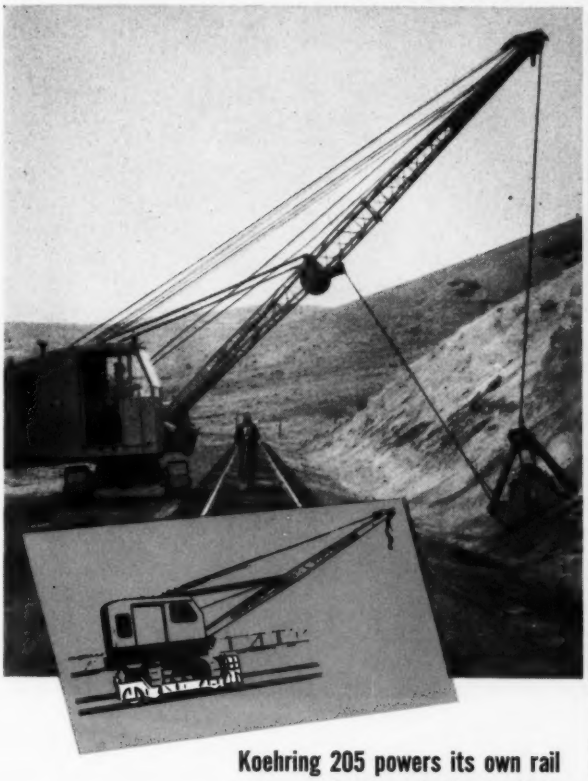
VERSATILITY plus ECONOMY with Monotube piles. When soil conditions at this site in Mansfield, Ohio, prohibited conventional construction in crossing low-lying land, this adaptation of a foundation supported on Monotube steel piles proved to be an economical solution.

Tapered, fluted Monotube piles are available in lengths, diameters and gauges to meet every requirement. Write The Union Metal Manufacturing Co., Canton 5, Ohio, for complete information.

UNION METAL

Monotube Foundation Piles

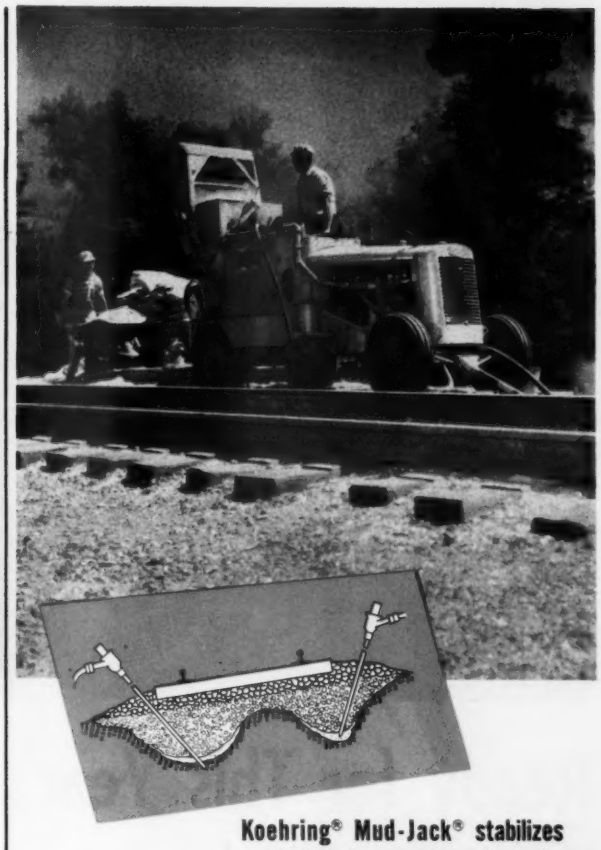
2 WAYS to simplify track maintenance:



Koehring 205 powers its own rail car . . . loads, unloads itself in 10 min. . . . works on or off-track

Wherever there's excavating, lifting or material-handling to be done, Koehring® RailAid® takes to the rails — travels on-track from one work-section to the next at speeds up to 20 m.p.h. It's self-propelled — does 2 to 3 times the work of other excavators or cranes that have to crawl or be hauled from job to job.

At the same time, you get full flexibility for working on or off-track because RailAid combines all the advantages of a self-propelled track crane with the versatility of a standard crawler crane or excavator. It loads or unloads itself on ramp-equipped car in less than 10 minutes. Crane or excavator sets car on and off-track — clears the right-of-way for normal through traffic. Work is uninterrupted for the complete shift. Propulsion car has 2-axle drive, with airbrakes on all 4 wheels. Torque converter gives smooth control of 20 m.p.h. travel speed. Wide car-well accommodates 16, 20 or 24-inch crawlers on excavator or crane. As a crane, Koehring RailAid safely lifts up to 6.9 tons from the car — 8.9 tons on ground. Converts to clamshell, dragline, ½-yard shovel or hoe — cleans ditches, widens banks, stockpiles coal or ballast, loads or unloads cars, repairs trestles, lays rails, does pile-driving. Want more facts? See your Koehring distributor or write today.



Koehring® Mud-Jack® stabilizes track-bed, leaves firm sub-grade, no interruption to rail traffic

Here's a labor-saving way to get better conditioned track, and reduce "slow orders". Koehring Mud-Jack corrects pockets in ballast and sub-grades without interrupting rail traffic. Injection points are driven into the lower ballast. Mud-Jack pumps a soil-cement slurry into weakened area — displaces air, water and water-saturated material — leaves firm *permanent* sub-grade. High fills, as well as shallow grades, are treated by the Mud-Jack method. Slurry can be forced 70 feet deep or more, to stabilize fills at trestle ends. Production capacity: Pumps 200 cubic feet of slurry per hour at pressure of 400 PSI. Read all about it in the new Mud-Jack catalog.

Mail to: KOEHRING Division of Koehring Co., *Milwaukee 16, Wisconsin*

Please send latest catalogs on: ☐ *Mud-Jack* ☐ *RailAid*

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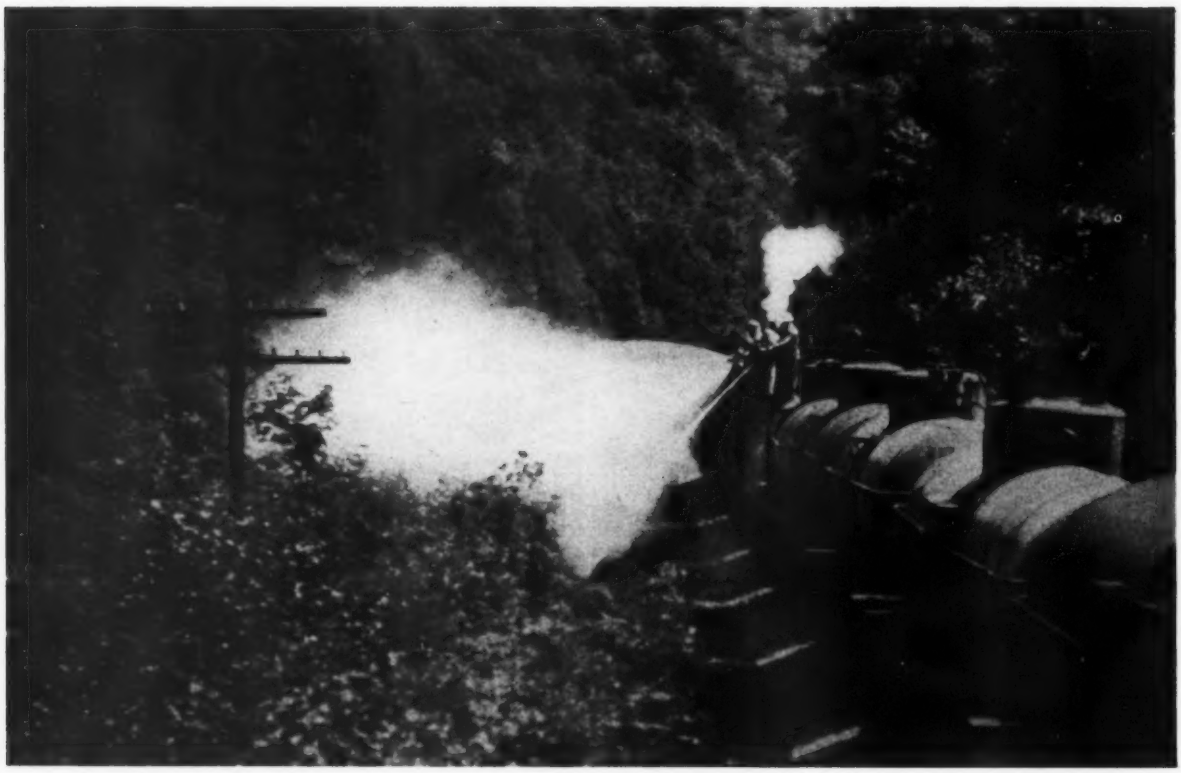
RailAid® **Mud-Jack®**



Ready for This Year's Weeds and Brush?

They Will Be With You Soon! . . .

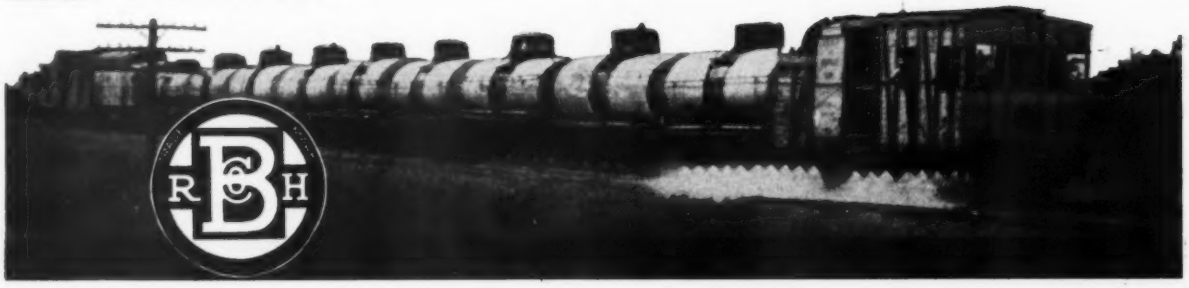
BOGLE IS READY . . . ready with the correct chemicals to make short work of weeds and brush along your roadway. Complete treatment by experienced operating personnel, using the latest and best equipment on rails, keeps weeds and brush under control. The result is a dependable and economical solution to the problem of roadway growth.

Let us plan a program for you. Visit us at the N.R.A.A. exhibit Booth No. 5-N.

THE R. H. BOGLE CO.

ALEXANDRIA, VA.
Memphis, Tenn.

***Complete* Weed and Brush Control Service**



The NORDBERG "LINE INDICATOR"

...latest *Mechanical Muscle* quickly lines both tangent track and curves

Operator stops Trakliner at joints, centers and quarters to move track to correct position. At each of these points the track is moved in either direction, as required, to bring the indicator pointer to zero.

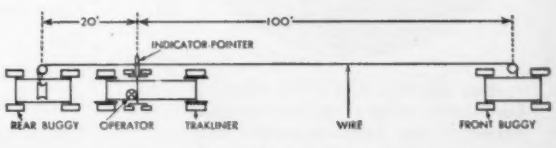
The single strand of wire used in the "Line Indicator" is carried in a fixed position and passes through the indicator at the Trakliner as shown above. If the track is out of line, the amount of deviation is shown by the pointer. Prior to lining, the reference wire is accurately adjusted so it is equally distant from the gage side of the line rail at the front and rear buggies, and at the pointer carriage. *Note arrangement of unit in diagram below.*

Quick, lower cost lining of curves and tangent track is now possible with the Nordberg *Line Indicator*. Using the well-known Trakliner® as a central unit, this new "Mechanical Muscle" does the complete job of sighting and lining track.

Sighting is accomplished with a 120-ft. length of wire. This wire is mounted on a moving assembly consisting of two 4-wheeled buggies which are maintained at proper distance from the Trakliner by lengths of tubing. One of the buggies is located 100′ ahead of the Trakliner and the other 20′ behind it. An indicator, mounted on a small carriage, is placed directly beneath the Trakliner in full view of the operator. If the track is out of line in relation to the reference wire, the amount of deviation is shown by a pointer on the indicator. The Trakliner then makes the correction.

Under average conditions, the Nordberg *Line Indicator* and Trakliner will line a rail length of tangent track in two minutes or less. In lining curves, two "passes" around the curve are made. The first, to obtain original "ordinates" and the second, to line to the desired final ordinates. A recently ballasted, one-degree curve, 4900 feet long, was lined by this method in only four hours.

A Trakliner operator and a man to adjust the pointer scale are all the crew that is required . . . together they can easily remove the light-weight buggies and tubular sections, as well as the Trakliner, from the track.



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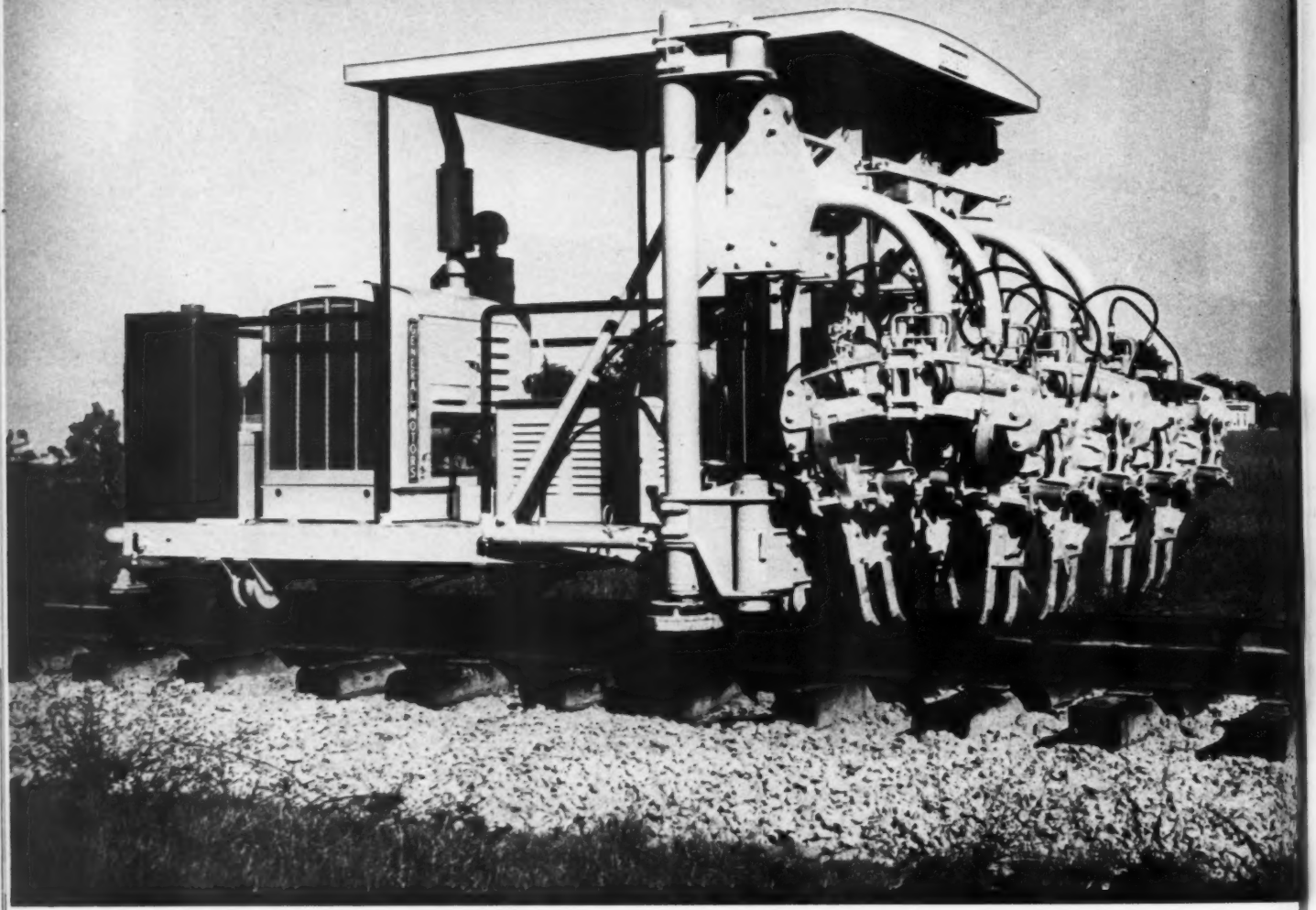
NORDBERG MFG. CO.
Milwaukee 1, Wisconsin

See the new "LINE INDICATOR" and the many other Nordberg Mechanical Muscles at the Chicago Coliseum, March 10-13.

NORDBERG
Mechanical Muscles®

THE JACKSON TRACK MAINTAINER



Note the direction of the tamping bars which assures perfect consolidation of the ballast in the vital load-bearing zone directly beneath the rail.

Only the Best is good enough!

Anything less in tamping equipment means higher than necessary production costs . . . greater frequency of recurrent costs, and track less resilient and smooth-riding than it might be.

✓ *Check these facts:* **THE JACKSON TRACK MAINTAINER** is the only machine in its category that provides maximum ballast compaction uniformly under each tie . . . and concentrated directly under the rail . . . a homogeneously consolidated tie bed that runs continuously from the outer end of the tie to the specified distance inside the rail.

Only a JACKSON TRACK MAINTAINER, with its powerful, high frequency vibration can produce such a large area, long-lasting track bearing in any lift from 0 to highest practical limits, and in ballast of any size or condition!

These FACTS, confirmed by users of a great majority of the leading roads, account for the tremendous preference shown for this machine.

✓ **HYDRAULIC LIFTING JACKS,** as shown above, are now available as an accessory to the 1958 JACKSON TRACK MAINTAINER for efficient spot tamping at unprecedented low cost. This accessory, in complete kit form, is also available for 1957 and earlier models. Write or phone for complete details.

JACKSON VIBRATORS, INC., LUDINGTON, MICHIGA

RAILWAY TRACK and STRUCTURES

Rail anchors . . .

Attain new stature as a cost-saving device

Investigation shows the railroads generally are placing more emphasis on proper rail anchorage than ever before. The result has been a significant increase in the use of anti-creepers per rail length. Here are the principal factors behind this trend:

- ***A keener appreciation of their cost-reducing features***
- ***Education of management in the advantages of their use***
- ***Increasing use of continuous welded rail and 78-ft rail***
- ***Track effects produced by operation of diesel power***
- ***More attention to adequate rail anchorage on branches***
- ***Growing use of centralized traffic control systems***

● "Inadequate anchorage is one of the most detrimental things that can happen to railroad track." An engineer maintenance of way made this particular statement. But any number of track men spoke the same thought in different words during recent interviews with *RT&S* editors. In fact, no one could be found who disagreed with it.

In view of the recognized importance of adequate anchorage it might be supposed that a great deal of published material would be available on the subject in the form of technical reports. But such is not the case. Over the years there has been a scattering of AREA committee reports on the subject, which are mostly in the form of reports on research projects. A thorough search failed to reveal much of anything else except occasional references in the pages of this magazine.

This paucity of published material is in strong contrast to the intense interest displayed by track men when the subject of rail anchorage is mentioned. Just ask a question or two and they'll usually talk at great length. To one who is interested in track these conversations are extremely interesting. They bring out a wide range of personal experiences with rail creepage and anchorage, and also theories on how to keep rail from running.

But there is something else, too. After a few of these conversations, a central thought begins to emerge. What we begin to see is that track men—and their superiors up in the front office—are more "anchorage conscious" than ever before. Which means that, on most roads anyway, rail-anchor usage has been increasing.

Why and how has this change in thinking occurred? We get the answer direct from top maintenance officers. Here's a large railroad, for example, that established standards for rail anchorage back in the late 'Twenties. These called for a minimum of six anchors per rail length where the joints were not slott-spiked, and five anchors where slott-spiking was used.

Even then these standards were recognized by the road's engineering officers as inadequate. But they were the best they could do in view of management's attitude that anchors "were an unnecessary adjunct to track maintenance," according to an engineering officer. While these standards prevailed on this road there were many cases where attempts were made to get authority to apply additional anchors. For the most part, however, these were denied by the general managers.

Meanwhile, the M/W people were doggedly pursuing a policy of educating management personnel. At every opportunity they were shown where inadequate anchorage was resulting in excessive expenditures for correcting poor line and surface and slewed and bunched ties.

They finally got results

After many years these efforts began to bear fruit on this particular road. New standards were adopted calling for sharply increased anchorage over the former practice. Briefly, they allow 8 to 16 anchors, all boxed, on single track with unslotted joints; 8 to 12 anchors, also boxed, on single track with slot-spiked joints; and 12 to 16 anchors per rail in double-track territory. Four of the anchors in double-track territory are back-up anchors, boxed in.

But this isn't all. The management of this road now recognizes that anchorage beyond that called for by the standards is frequently necessary. The result is that additional anchors may be applied at the discretion of the roadmaster and the division engineer.

Generally the practice is to bring the anchorage up to standard when laying new rail. Further than this, a program is carried out each year to apply additional anchors in territories where no rail is being laid. Management now takes these programs for granted. The question is not whether there should be a program, but, rather, how extensive it should be.

New conditions helped here

Here is another interesting case history on rail-anchor usage. In this case, again, management was slow to recognize the value of adequate anchorage. Perhaps this was partly because top engineering officers themselves were not entirely convinced that additional anchorage was economically justified. Changing circumstances conspired to help alter the thinking of both groups.

About ten years ago this road was using, on the average, 10 anchors per 39-ft rail. There was plenty of evidence that this anchorage was insufficient, but for a long time manage-

Base-type anchors . . .

Modern types of rail anchors

Bulldog

Double U

Improved Fair

Improved Gautier

M&S

RAIL ANCHORS cont'd

ment was convinced that the evils could be eliminated merely by reversing some of the anchors.

The thinking on this road began to change when it undertook a systemwide reballasting program involving the raising of the track on 6 in of stone ballast. About the same time it began to use diesel power on a large scale. Evidence soon developed that the anchorage being used was insufficient to keep the rail from running where the track had been raised. This was particularly true on long grades and other locations subject to dynamic braking by diesels.

Experience with the old standard for anchorage under these conditions was a convincing lesson. The standard was raised first to 12 anchors per rail and then in 1956 to 14. On single track the anchors are boxed. In double-track territory they are placed in either a 10 and 4 arrangement or 8 and 6, with the back-up anchors boxed in.

When laying rail on this road, the field forces are encouraged to apply anchors in accordance with the standard. The track is then watched to see if movement occurs. If it does a pair of anchors may be changed. If movement still occurs additional anchors are applied. This road is also programming the placing of additional anchors following out-of-face surfacing work. For instance, on a stretch of track that was surfaced last year, and where there are only 12 anchors per rail, the number is being increased to 14 this year.

The engineer maintenance of way of another road related details of a campaign he conducted on behalf of adequate rail anchorage. These efforts extended over a period of more than 20 years. He devised equipment for measuring rail movement, and made many tests at various points. Circulation of the results in the right places, accompanied by persistent efforts to "sell" adequate anchorage, eventually produced results. Now the road is using 14 anchors per rail length in single-track, main-line territory. While less than AREA recommendations this number is a long advance over former practice. Unlike some other roads, this line does not box any of its anchors because it "does not like the resulting back and forth movement of the ties."

More CTC—More anchorage

The increasing use of CTC has helped to foster the new attitude toward rail anchorage. "Anchoring the rail against running is a 'must' job in CTC territory," according to a committee report of the Roadmasters' Association. "Running of the rail," it declared, "will adversely affect the switch and signal control mechanisms quicker than any other factor, and both main and side tracks must be properly and adequately anchored against running rail." It described a plan of anchoring switches that calls for the use of 1,100 to 1,500 anti-creepers at each switch, depending on the length of the turnout.

Regardless of the method used to anchor switches, the anti-creepers must be maintained tight against the ties, said the Roadmasters' committee. "On new CTC installations this matter is of paramount importance, for if the anti-creepers are not kept seated against the ties expansion may be lost or bunched, with resultant jamming of the switch points."

Both base-type and compression-clip type anchors are used to anchor switches. One road uses clip anchors on all spring switches and remotely controlled switches. Its standard calls for placing these anchors on all except the joint ties for a distance extending through the turnout and for five rail lengths each way.

Maintenance men also say that passing sidings in CTC territory require more anchors than in non-CTC territory. This is necessary, they explain, because of the higher speeds of trains through these sidings, and the effect of dynamic braking where diesels are used.

On one road the usual practice is to anchor these passing sidings in the same manner as the main line for a distance of 10 rail lengths beyond the frogs. In between, the number of anchors applied is slightly less than on the main line. On another road that applies 14 anchors per rail length on the main line, standard practice calls for 6 anchors on passing sidings. However, this number is considered inadequate by at least some of this road's track supervisors. One of them, for example, feels that at least 10 anchors should be used per rail length on passing sidings.

Better anchorage on branches

Branch lines have been an important beneficiary of the new attitude toward rail anchorage. Maintenance engineers in general will tell you that until fairly recently branch line anchorage was grossly neglected on most roads. In the past it was not uncommon to find branch lines that were not anchored at all except possibly for such anchorage as provided by slot-spiked joints.

Most railroads are now giving more attention to proper anchorage of their branch lines. This is partly a reflection of the same thinking that is causing more anchors to be used on main lines, i.e., it's being done as a means of reducing maintenance costs. However, there are specific factors that apply in individual cases. Heavier locomotives and cars and longer trains are among these. Also, here and there you will find a branch line that is carrying more traffic than before. In other instances railroads have upgraded some of their branches through rail and tie renewals and reballasting. The application of more anchors is a logical phase of such programs.

When relaying rail on branch lines some railroads take advantage of the opportunity to apply more anchors. Others do it when surfacing out-of-

Two-way anchors . . .

face. (On branch lines that were only slot-spiked before one railroad applies 6 to 10 anchors per rail when surfacing out-of-face.) In still other instances more anchors are applied as a program in itself.

An interesting experience is cited by the engineer maintenance of way of a road that has placed considerable emphasis on proper branch-line anchorage. "We had a branch line," he said, "that was laid with light rail and slot-spiked but not otherwise anchored. The north rail ran east about four feet, resulting in all the track defects you would expect from creepage like this. To correct the situation we took off the bars, reformed and reapplied them. We straightened the ties and lined and surfaced the track. We also applied six anchors per rail. This work involved 140 miles of track and was done in 1943. There has been no appreciable rail movement since."

This road has carried out similar programs on many other branches. Generally where the joints are slotted four anchors per rail will be applied, although six may be used if excessive rail movement is encountered. Slot-spiked joints are found on this road only with rail weighing up to 75 lb. Where branch lines are relaid with heavier rail slotted angle bars are not used. In that case more anchors are applied; never less than 8 and in some cases as many as 12 or 14.

Long rails bring new problems

New problems in rail anchorage have come about as a result of the increasing use of continuous welded rail and rail welded into double (78-ft) lengths. In fact, there are those who are convinced that these problems are partly responsible for the greater interest in anchorage generally.

With continuous rail there are two distinct problems in anchorage. One concerns the anchoring of the ends of the long strings when they are joined by conventional bars. The other is the anchoring of the intermediate portions of the lengths.

Judging by the comments of maintenance engineers, the problem of end anchorage is causing the most headaches. A subcommittee of the AREA Special Committee on Continuous Welded Rail has recommended "that 6 rail lengths (234 ft) be fully box-anchored at the ends of welded rail sections of track and on connecting conventional bolted track." This recommendation, it goes on to say, "is for the minimum amount of anchorage for tracks carrying both one-way and two-way traffic to take care of temperature stresses, but it will also provide anchorage against rail creepage due to train movements."

A later report developed the fact that the extent to which railroads were adhering to these standards varies widely. What is happening is that individual roads are experimenting to determine the type of anchor-

NOW—Machines for applying rail anchors

The application of rail anchors has always been a manual operation. Recently there has been increasing pressure to develop machines for this task. The need to reduce costs is a factor, but proper application is another consideration. Track men want the anchors placed snuggly against the ties, especially where they are boxed in. They feel machines are the best answer to this problem.

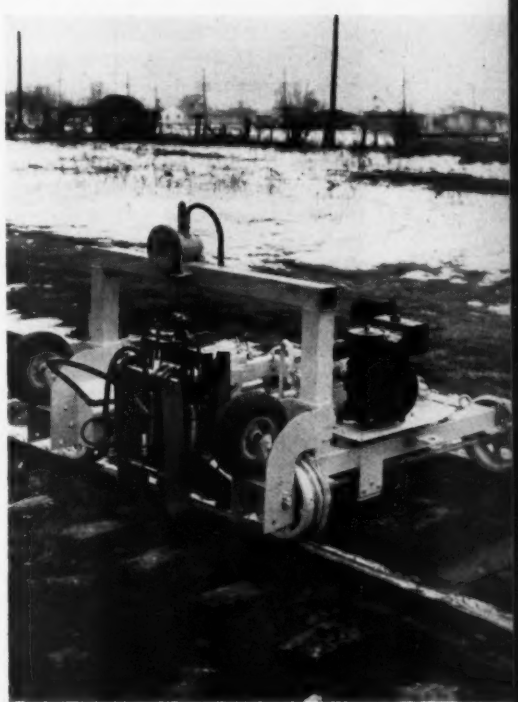
There has now been a "breakthrough" in the development of mechanical rail-anchor applicators. A number of them are described below and on following pages.

RACINE HYDRAULICS—This machine is designed particularly for the efficient and economical box-anchoring of ties with either drive-on or tool-applied anchors. It is also said to be an efficient machine for single-anchor applications.

The Racine applicator is a self-propelled, hydraulically operated machine, and has a positive adjustable stop to eliminate over-driving. Anchors are said to be squeezed onto the rail base quickly and in the proper place for maximum holding power. During the box-anchoring operation the anchors are held against the tie with a pressure of 1400 lb, says the manufacturer. It is also said that, when applying anchors, no more clearance is needed under the rail than is required by the anchor itself.

Full control of the machine is through directional operating valves, located, for the operator's convenience, in a non-fatiguing position. The manufacturer says that the unit was designed with safety as well as production in mind.

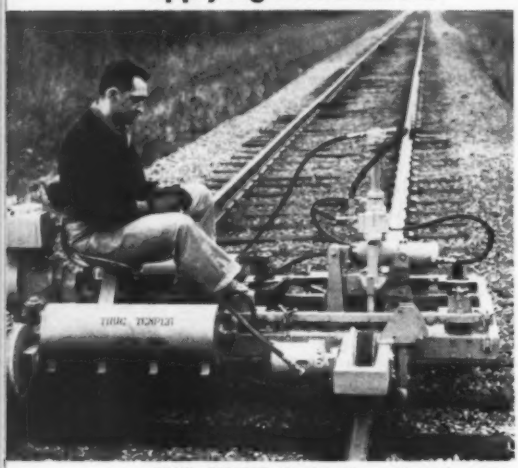
The operator is seated in front of the applying tools with clear, unobstructed vision for both track movement and during the anchor application. The machine can be removed from the track on rubber-tired set-off wheels or with an unloading hook. *Racine Hydraulics & Machinery, Inc., Dept. RTS, Racine, Wis.*



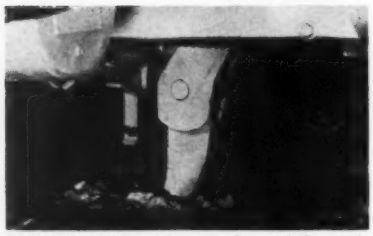
THE RACINE machine is designed to apply drive-on and tool-applied anchors.

Other types of machines

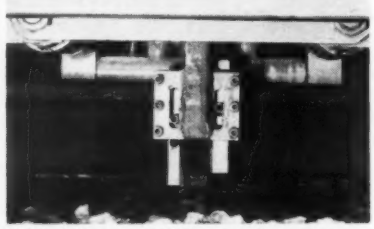
More machines for applying rail anchors



TRUE TEMPER hydraulic rail-anchor applicator is self-propelled.



DRIVING ARM applies anchor while positioner holds it against tie.



CLAMP braces outside of rail against inside pressure required to install anchor.

TRUE TEMPER (HYDRAULIC)—This is a self-propelled machine that is operated by one man from a driver's seat. Right-hand control moves machine along rail in both directions. Left-hand control actuates the anchor-installing arm. Foot control operates the anchor positioner.

Anchors are applied by arm that is said to exert a maximum pressure of 18,250 lb on the anchor. A positioner forces the anchor against the side of the tie and holds it there under compression during installation.

The entire positioning and installing unit lifts to clear grade crossings. Maximum travel speed is 20 mph, with an 8 to 10-mph working range.

Production rate claimed for machine is roughly 600 to 700 anchors per hour. It is said to install Bulldog anchors with maximum speed and effectiveness, but its efficiency in applying other makes of anchors has not yet been fully determined, says the manufacturer. *True Temper Corporation, Dept. RTS, 1623 Euclid Avenue, Cleveland 15, Ohio.*

RAIL ANCHORS cont'd

age that will best suit their particular conditions. Not too many of them feel they have found the final answer.

How to hold the ends

Here's an account of a typical railroad's experience. This road, incidentally, has a considerable mileage of continuous welded rail. At the outset it followed the practice of boxing every other tie throughout the long lengths. However, evidence developed that some movement was occurring.

Extensive field measurements brought out the fact that the movement was taking place primarily in the five rail lengths each way from the joints between the long lengths. The road then adopted the practice of placing "kicker" anchors throughout these five rail lengths. These are anchors placed against alternate ties to resist movement away from the joint. Reports are that these additional anchors have proved successful."

The experience of this road, incidentally, emphasizes the need for maintaining a full ballast section in *every* crib in long-rail territory. "Practically every time we had a pull-apart at joints between long strings," said one of its engineering officers, "field investigation brought out the fact that the ballast in at least some of the cribs was not up to the standard section."

Another road, just beginning to lay welded rail on a large scale, is trying out several anchorage patterns at the joints between long strings. Generally, its practice has also been to apply "kicker" anchors for five rail lengths each way from the joints, in addition to box-anchoring every other tie. In a recent installation, however, it box-anchored every tie for a distance of 2½ rail lengths. In still another test it applied 24 compression clips per rail for five rail lengths. This road expects to adopt a standard anchorage pattern for continuous rail by June 1958.

Anchorage of the intermediate portions of continuous rails is, in a sense, a different problem from that involved in jointed track. In the latter case the purpose is to maintain uniform gaps at the joints. With welded rail the purpose is to achieve uniform distribution of the internal forces in the rail and to minimize movement of the rail in case of a break.

AREA Recommendations

Recommendations on the amount of intermediate anchorage required for welded rail have been made by the Special Committee on Continuous Welded Rail. Says this committee: "For average one-way traffic it is recommended that anchors be placed on alternate ties in the direction of traffic, with every fourth tie box-anchored for back-up movements; and for average two-way traffic, that alternate ties be box-anchored throughout the length of the welded rail section." Noting that these recommendations are slightly higher than those of the Track committee for conventional bolted track, the Welded Rail Committee explains that the "higher number of anchors is necessary to protect against possible rail breakage."

The committee makes no recommendations as to the type of rail anchor or clip to be used. From replies received to a questionnaire, "it can be stated," says the committee, "that both rail anchors holding in one direction only, and rail clips holding in both directions, have been used satisfactorily."

Checks with various railroads using continuous welded rail indicate fairly close adherence to the AREA recommendations for anchoring the intermediate portions of long strings. Several roads are box-anchoring every other tie in single-track territory, and one even in double-track territory. Another road is box-anchoring every third tie in double-track territory, with a single back-up anchor in between.

Railroads experimenting with tight "frozen" joints are using various amounts and patterns of anchorage, although, in general, the problem is about the same as with welded rail.

No disagreement here

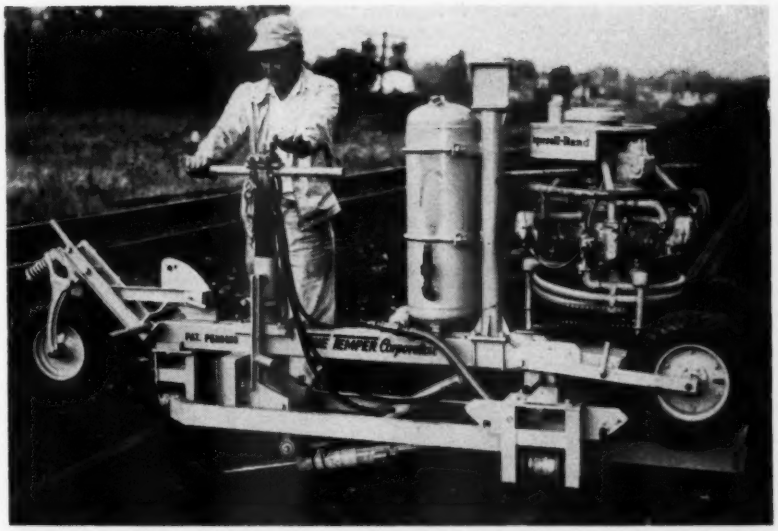
There may be differences of opinion on the anchorage pattern for long rails but all track men agree on one

TRUE TEMPER (PNEUMATIC) — Power source for this machine is an Ingersoll Rand R-36 air compressor which actuates a cylindrical steel rod. The rod drives the anchor into the rail base and is controlled by the operator with a lever.

The machine is propelled and operated by one man. Mounted on three wheels it is said to roll with only a five-pound push. Weight of the machine is 1800 lb. Retractable, rubber-tired set-off wheels are provided to facilitate moving the machine to and from the track.

It is reported that this applicator has already been used on half a dozen different lines and that it has installed an average of about 15 anchors per minute. The savings, according to the manufacturer, amount to about 60 per cent of the labor cost of applying anchors.

Like its hydraulic counterpart, the machine is available for applying Bulldog anchors with speed and effectiveness, but its performance in applying other types of anchors has not been fully determined. Distribution plans are not yet complete.



PNEUMATIC machine developed by True Temper is pushed and operated by one man. It is reported to save 60 per cent of the labor cost of applying anchors.

point: The anchors must be properly applied. Primarily this means they must be placed snugly against the ties. Proper supervision is necessary if this is to be accomplished. One engineer admitted there had been occasions on his road where five to ten per cent of the rail anchors had been improperly applied.

Seventy-eight-foot rail presents another special anchorage problem. With this rail the problem is to keep the joint gaps in reasonable limits during cold weather. A road that uses considerable 78-ft rail started out by applying 12 anchors per 39-ft length. To minimize the joint gaps, its practice, when laying such rail, is to use shims of the same thickness as would be indicated for standard-length rail. When the 12 anchors did not prove sufficient the number was raised to 16 anchors per 39-ft length. The results are better but many joints still open up to ⅜ in and some as much as ½ in. "I'm beginning to think we may have to 'freeze' the joints in this rail," said the engineer M/W.

There is no doubt that the rail anchor has achieved a new stature in the eyes of track men—and their superiors too. Perhaps the reasons can best be summarized in these words of a man with extensive experience with anchorage problems. "I like to think of the rail anchor as a labor-saving machine." he said. "With wages what they are today, I can't think of anything that gives us a greater return on the investment."

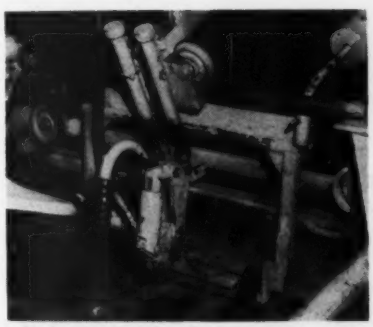
UNIT rail anchor applicator weighs about 500 lb. Application of anchors is accompanied by lateral pressure to force them up against the tie.

UNIT APPLICATOR—This machine is hydraulically operated. Power source is a Kohler 3½-hp gasoline engine operating a special Greenlee dual-pressure pump. The high-pressure side, set to develop a pressure of 6500 psi, operates the applicator shoe. The low-pressure side, which develops a pressure of 200 psi, operates the positioning mechanism.

The machine is operated and pushed by one man in a seated position. Applicator mechanism is suspended from a carriage that operates on a longitudinal rod. Mechanism is counterweighted for easy handling and a handle permits the shoe to be adjusted longitudinally as necessary. The pressure developed when applying anchor is absorbed by clamp bearing against top of rail. Clamp may be adjusted for various weights of rail.

When being applied anchors are forced against tie by positioning arrangement that applies a pressure of about 275 lb. The hydraulic cylinders are controlled by two levers, one for the positioner and the other for the applicator.

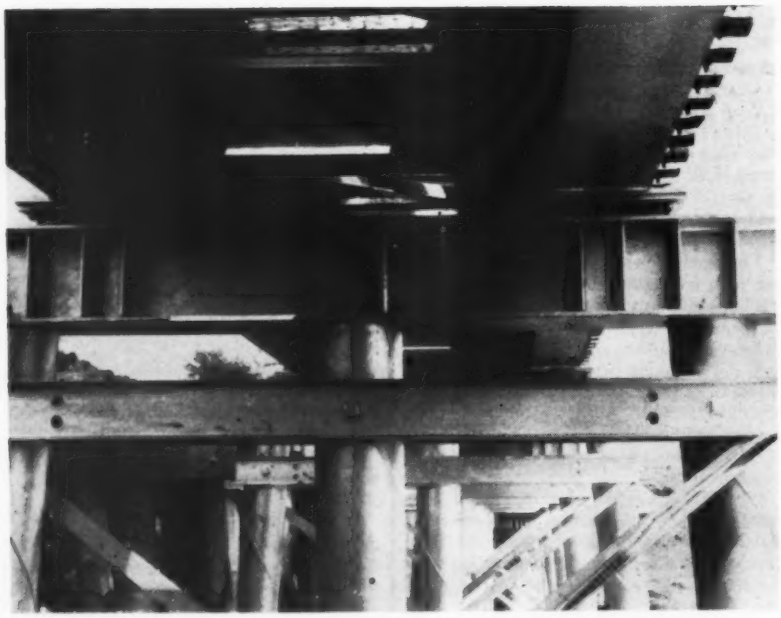
This machine is designed particularly for applying spring-type anchors but may be adapted later for applying drive-on anchors.



APPLICATOR shoe is hung from carriage that operates on longitudinal bar.

It was developed by the Unit Rail Anchor Division, Hubbard Specialty Products, Inc., in collaboration with Greenlee Bros. & Co. *Unit Rail Anchor Division, Dept. RTS, 6301 Butler Street, Pittsburgh 1, Pa.*

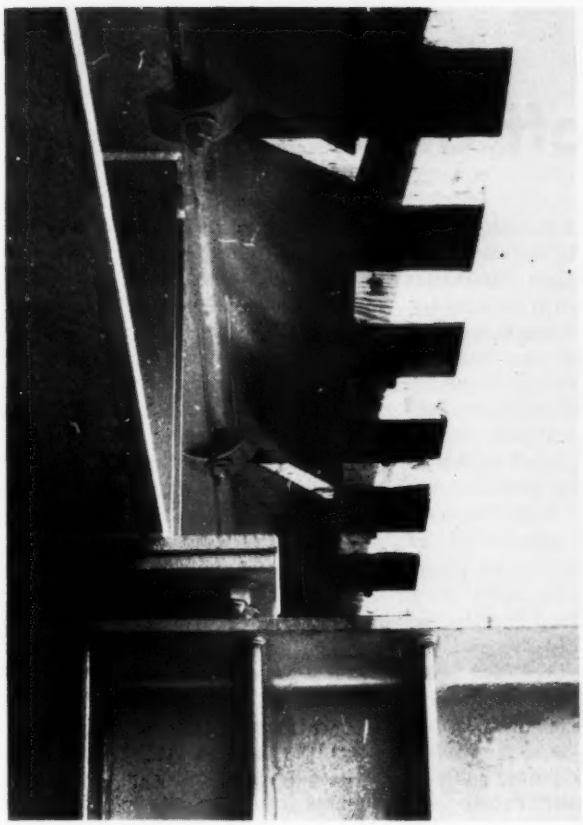
Steel trestle has 3-pile bents



CAPS WERE WELDED to pipe piling. Pipes were filled with 3,500-psi concrete.

• The Toledo, Peoria & Western formerly crossed Indian creek near Fairbury, Ill., on a 330-ft open-deck timber trestle. Maintenance on the single-track structure had been getting heavier each year. While the road's engineers wrestled with the problem, the Illinois State Highway Department made an announcement which, in effect, demanded railroad action.

The announcement disclosed plans for raising the grade of an existing highway bridge and approaches adjacent to the TP&W's trestle. One of the highway approaches crosses the road's main line several hundred yards east of the trestle. Such a change, it was immediately apparent, would also affect the grade of the TP&W main line in this area. The railroad either had to rebuild and raise the timber trestle or replace it with a new structure.



ASBESTOS-BONDED drip plates were installed atop girders before decking was placed to protect against brine drippings.

INGENIOUS spiral-guide cutoff method was used to cut off tops of batter-driven piles before caps were welded in place.

Concrete-filled steel pipe was used by the TP&W for piling in a new 8-span bridge near Fairbury, Ill. I-beam caps were welded and bolted at each bent. New structure found to be more economical than repair of existing timber trestle.

The existing trestle could have been repaired and new timber piles driven to raise the grade. However, a complete study of the situation convinced the railroad that changing the location of the main track and building a new steel bridge to the height and length required would be more economical.

The survey also included an analysis of the drainage area. It was found that a change in the stream channel would enable the railroad to eliminate 170 ft from the original stream crossing.

To replace the timber trestle the road designed an 8-span 160-ft-long bridge, using Armco steel pipe piling, steel caps and steel girders. Each of the nine bents includes three steel piles filled with concrete to provide E-72 loading. All bents are on 20-ft centers.

Abutment walls of 10-gage interlocking Armco steel sheeting were constructed at each end of the bridge. They are tied in with the end bents by steel channels. Steel abutment walls were used for long life and protection against grass fires. The bridge design also includes asbestos-bonded sheets between the girders and ties to protect the steel girders from brine drippings.

Each of the 27 pipe piles has a diameter of 12¾ in and a wall thickness of .250 in. A ¾-in flat steel plate provided end closure for driving. No splicing was necessary. The piles were driven alongside the old trestle to an average depth of 28 to 30 ft, using a McKiernan-Terry 9-B-3 hammer. The outside piles of each bent are designed for a loading of 43 tons; each center pile is designed for a loading of 67 tons. Outside piles were driven on a 1:12 batter.

After the piles were driven and braced, they were cut off and filled with 3500-psi concrete. To stiffen the piles, concrete collars were poured at the water line around all intermediate bents. Steel I-beam caps, 12 ft long, were welded and bolted to each bent. Pre-assembled steel girder spans, 20 ft long, were then positioned and bolted to the caps.

The asbestos-bonded drip plates were installed on top of the girders before the deck and track were placed. Placement of fill to meet the grade change, relocation of the main-line track, and destruction of the old timber trestle completed the job.

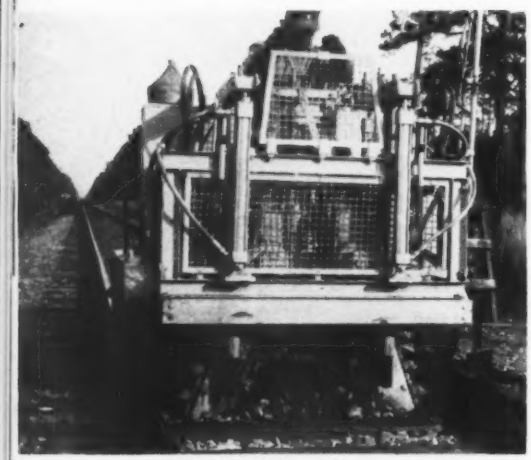
Plans and specifications for the new bridge were prepared by D. E. Brunn, TP&W office engineer, under the supervision of R. H. Egbert, chief engineer.

What's new on the Seaboard? That question is timely because of this road's penchant for devising new track equipment. We take a look here at its tie-renewal and surfacing practices. A type of machine used that is relatively new in this country is the Plasser tamper. Other special devices and features are:

In tie renewals, surfacing . . .

Ingenuity pays off on Seaboard

How ties are renewed . . .



LEAD MACHINE supplants two men and is a railroad-built unit for removing ballast out of the way of the tie saws.

TIE CUTTER can now be worked with less chance of damaging the saw blades in the granite ballast.

• The Seaboard Air Line has the distinction of having originated several track-maintenance machines which have caught on in the industry. Some of these are now being produced by equipment manufacturers.

How does the Seaboard use the machines developed by its own people? What other machines or devices, not generally used in the industry, are in service on this road?

To get answers to these questions, arrangements were made for an *RT&S* editor to visit several gangs, including a tie-and-surfacing gang. This gang was working between Savannah, Ga., and Columbia, S. C. It is representative of seven such gangs on this road that work the year around. They are organized and equipped for the specific purpose of doing out-of-face timbering and surfacing work on main, branch and passing tracks. They perform no other work. The work of these gangs is programmed ahead for five years and planned on cycles which average approximately 4½ years.

Each tie-and-surfacing gang is built around a production tamper and consists primarily of three work units. The lead unit renews ties, the second does the raising, tamping and surfacing, and the rear unit lines the track and equalizes the ballast. While working, the gang is protected by flagmen and slow orders.

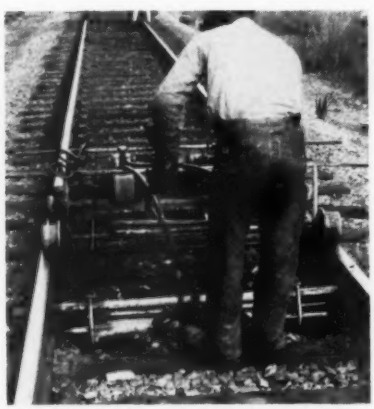
FIRST UNIT—TIE RENEWALS

This unit is composed of an assistant foreman, 2 track-machine operators, 6 laborers who work the small track machines, and 6 other laborers. The equipment consists of a ballast remover, two Woolery tie cutters, a Fairmont spike puller, a Woolery tie-end remover, a Fairmont tie-bed scarifier, a Fairmont tie handler and an RMC Spike Master.

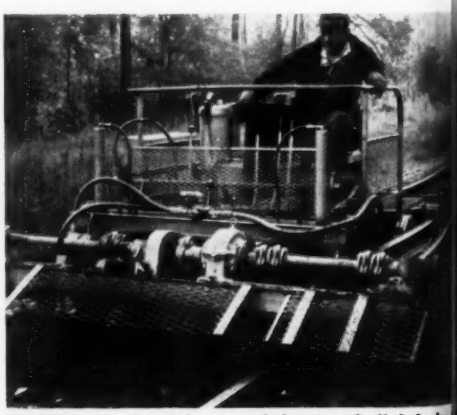
The lead machine employed by this force, the ballast remover, turned out to be another new development of the Seaboard. It lowers the ballast level on each side of a tie that is to be removed so that the saw blades of the cutter work only in wood. Operated by one man this machine cleans out the ballast on the inside of both rails simultaneously, making only one stop at each failed tie. Prior to use of this machine two men were generally needed for this operation.

The ballast remover was built at the road's work-equipment shop at Hamlet, N. C. It is driven hydraulically through a pump which develops 1,000 psi and is powered by a 7-hp. Wisconsin gasoline engine. It has two chain-driven paddle-equipped chains for digging the ballast and depositing it in the center of the track. The paddles are hardfaced and made of carbon steel. The machine can

SPIKES are pulled from the cut ties by a Fairmont spike puller. This machine pulls spikes at both ends of the ties.



TIE CENTERS are removed by a laborer, after which a Woolery tie-end remover shoves the ends from beneath the rails.



TIE BEDS are cleaned out and deepened slightly by Fairmont tie-bed scarifier, manned by a track-mach operator.

- **Railroad-made ballast remover used ahead of tie cutters**
- **Wire-type devices for raising and lining track**
- **Metal wedges that hold the raise until track is tamped**
- **Special portable set-offs for power jacks; other equipment**

run from 20 to 25 mph while deadheading.

The tie-renewal force changes out from 250 to 300 ties per mile. Yet it is able to work far enough ahead to insure that the surfacing operations will not be delayed. The ties are marked for renewal by the roadmaster and new ones, No. 4 and 5 treated oak or gum, are distributed from 30 to 45 days in advance of the gang by the small 8-man gang using a work train.

Besides renewing ties, the tie-renewal unit does necessary work at highway crossings preparatory to surfacing, surfaces turnouts, moves track-machine set-offs and lines curves that require throws of more than one inch.

SECOND UNIT—SURFACING

This unit is organized around the production tamper or tampers.* The gang that was inspected was using a Plasser tamper. It is comprised of an assistant foreman and 9 or 10 men, 2 of whom are track-machine operators and 1 a machine operator (2 where two tampers are used.) Equipment consists of a Nordberg power jack, the Plasser tamper, and a push car carrying a Jackson four-tool tamping outfit for tamping insulated joints and in turnouts. With the power jack the Seaboard uses a wire-type device for raising the track approximately 1 in. The wire-surfacing instrument was invented by Seaboard general roadmaster W. C. McCormick and is now being marketed by Nordberg as the Trak-Surfacer for use with its tamping power jack. The railroad also added a hydraulic motor to the power jack to make it self propelling.

* Four gangs use a single Plasser tamper, two gangs use Matisas in tandem and one gang uses a single Matisa.

Uses wedges for raising

One of the surprising features of the gang that was inspected is the wedges that are used to hold the track raise ahead of the tamper. These are specially designed steel wedges which are inserted through the rail-spike slot in the shoulder of the tie plates on the field sides and under the rail base.

Here's how it's done:

Using the rail on his right as a guide, the operator of the power jack spots his machine over a tie and, with the spud bearing on the tie, raises the rails to the level indicated by the wire surfacer. It is important to note that, as the rails are lifted, the rail spikes in this tie are pulled to the extent of the track raise. On each side a laborer drives a wedge between the rail base and plate until he is stopped by the operator of the power jack. About three pulls to a rail length are made.

The wedges remain in place until the tamping machine has completed tamping the adjacent tie and are yanked quickly from beneath the rail as the tamper moves into position over the raising tie. The laborers removing the wedges are equipped with a special tool to effect their removal. One end of this tool has a short right-angle bend at one end, which is inserted into a hole of the wedge. The tool also has a hand-grip weight which slides up and down the shank of the tool. The other end of the tool has a shoulder-type stop. When the laborer slides the weight to strike sharply against the stop, the wedge is pulled free.

After pulling the wedges, the laborers nip the tie while it is being tamped. They then pick up the wedges and toss them onto the push car, pick up their wedge-removing tools and move on to the next raising tie. As the supply of wedges is used up at the power jack, the laborers doing the driving drop back to the push car, pick up and carry an armful back to the power jack, where they deposit them on a tray of a portable set-off towed by the power jack.

The portable set-off for the power jack is another railroad-devised unit. It is used primarily as a set-off for the

A TWO-WAY Motorola radio set enables the gang to have contact with on-coming trains, affords communication between work units.

NEW TIES are turned bottom up after unloading to prevent top checking and the creosote from drying out. They must be turned top-side up at time of installation and pulled into place by a Fairmont tie handler.

TIE PLATES are set in place and the spikes are started by hand. Following closely behind is an RMC SpikeMaster which nips up the ties and completes the spiking operation.

jack but it also carries a water keg, a can of gasoline and a tool box, as well as serving as a temporary depository for the supply of wedges. The set-off is made of aluminum members and rolls behind the power jack on four small flanged wheels. It has a vertical post member at each corner, which are perforated at 2-in intervals for securing by pins.

How set-off is used

When it comes time to set off the power jack, the machine can be stopped at any point on an embankment. The wire of the surfacer is then released and wound up on a spool. Next the power jack raises itself above the running rails, and the set-off rails are lifted from the portable set-off and set in place, thus establishing the proper clearance distance from the track. The portable set-off car then is affixed to the ends of the set-off rails. By holding the car at this level and dropping the four corner posts to the ground, it is pinned at the desired horizontal level.

The power jack can now be rolled sideways onto the portable set-off. The set-off rails are then detached and laid to one side. Meanwhile the segments of the surfacing instrument have been lifted from the rails and placed in the clear. The whole operation can be carried out in from 5 to 7 min.

The portable set-off is removed and set up right at the run-off and thus gives the raising unit more-on-track time. The men doing the raising find that the little extra time they gain while the tamper runs to a fixed set-off when clearing for trains, permits them to raise one more rail than they could if they had to run the power jack to the same set-off.

High production from tamper

The Plasser machine with this gang tamps all ties in a 39-ft rail in 2 min 10 sec, say Seaboard officers. Since ties average from 22 to 23 ties per rail, the machine production amounts to an average of one tie in less than 6 sec. However, its overall production is limited to its on-track time which, at best, is 7 hr 35 min in a 9-hr working day. The SAL's experience with the Plasser tamper has shown that the down-time of this machine is comparatively low.

To keep train delays and work interruptions at a minimum, the gang is equipped with a two-way Motorola radio for communication between work units of the gang and with oncoming trains. A portable telephone also is employed for contact with the dispatcher.

Set-offs for the heavier on-track machines are relocated as needed so that the machines never have to run more than 1½ miles to get in the clear of trains. The *RT&S* editor observed that three of the larger machines were removed from the track by five laborers in a total time of three minutes. The set-offs are of Seaboard design. They are each designed to fit a specific machine and each part is stenciled with the name of the machine it is to support.

Because the ballast section is maintained generally at the road's standard section, there is sufficient ballast available to raise the track on the existing ballast. Additional ballast is unloaded behind the tamping operation by the section forces at the rate of about 6 to 7 cars a mile. By using ballast pans the material is unloaded on the ends of the ties and is spread by a small plow hung on the journals of the last car of the work train.

How track is surfaced . . .

TRACK RAISING is carried out by a self-propelled power jack in conjunction with a wire surfacing instrument, also an SAL development.

WEDGES of steel are used to maintain the rail elevation effected by the power jack. They are installed at three points in each rail length.

THIRD UNIT—LINING

The third and last work unit of this gang is the lining force. This unit consists of an assistant foreman and

A set-off for each machine . . .

SET-OFFS are of railroad design and fabrication. Each set-off is designed for the specific machine it is to support and its various parts are stenciled to identify them.

PORTABLE SET-OFF is towed behind the power jack. It is another device of the Seaboard. Made of aluminum, it assists the raising operation to keep ahead of the tamper.

PLASSER TAMPER is the pace-setter for the entire gang. Nothing, except to clear for trains, is allowed to interfere with its continuous production. One insertion of the tools is made for all ties except the new ties placed by the tie unit, and these are tamped twice.

two track-machine operators. One operator works an RMC LineMaster, together with a wire-lining instrument, and the other runs a Kershaw Ballast Regulator. This force works as closely behind the tamping machine as is practicable and also assists in setting off equipment and other work as lining operations permit.

The wire-lining instrument is another device invented by Mr. McCormick and is an adaptation of the track-surfacing instrument. This device is now being marketed by Nordberg as the Line Indicator. Experience on the Seaboard is that it saves much time in lining both tangent and curved track.

The foreman makes two runs around a curve with this instrument. On the first pass, the ordinates of the existing curve are measured and plotted on a graph. A new alinement line is then plotted on the same graph to produce a regular pattern which approximates the mean of the original plotting. The operator then makes a second pass around the curve and, using the lining machine, throws the track to the ordinates of the newly plotted graph. An indicator on the machine tells the operator the correct throw to make.

General notes

Rounding out the personnel of the tie-and-surfacing gang is a foreman who supervises overall operations, a mechanic for servicing and repairing all of the equipment, two flagmen, a camp cook, a kitchen flunky, and one man employed for driving a truck for carrying lunches, fuel and oil from the camp to the gang. Two 1½-ton trucks, and two M-19 and two S2 motor cars are also assigned to this gang.

The Seaboard has seven such gangs working on its 4,100 miles of road, all of which were organized under W. D. Simpson,* former chief engineer, with the assistance of R. E. Tew, assistant to the chief engineer. On its Carolina division it employs two of these gangs, one using a Plasser tamper and the other using two Matisa B-24 tampers. The latter gang has one more machine operator in its consist for operating the extra tamper. Its North Florida division also employs two of these gangs, both of which use a Plasser tamper. The South Florida, Virginia and Georgia divisions each employ one gang. In addition, the road uses two of the older Matisa tamper models for spot surfacing as needed.

The productivity of these gangs varies from gang to gang because of different operating conditions. Rain, the number of trains and down-time of the machines also have their effect on any gang. However, the average output of these gangs is approximately 250 ties renewed per day and 3500 ft of track raised and surfaced per day.

Aside from Mr. McCormick others on the Seaboard have contributed to the development of the special equipment used by the tie-renewal and surfacing gangs. These include L. E. Connor, supervisor work equipment, his assistant J. R. Pollard, and structural designer E. L. Griffin. The special equipment is built at the road's maintenance-of-way work equipment shop, which is located at Hamlet, N. C.

* Mr. Simpson retired effective December 31, 1957, and has been succeeded as chief engineer by T. B. Hutcheson, formerly assistant chief engineer.

. . . Lined and finished

ANOTHER DEVICE of Seaboard origin is the lining instrument, here being used on that road with an RMC LineMaster.

BALLAST is added after the surfacing on the heads of the ties. It is then equalized by a Kershaw Ballast Regulator.

On the Pennsylvania . . .

The Pullman-Standard Winch Car . . .

And the Mannix Undertrack Plow . . .

DOWN on the ground after having been knocked loose from the raised track, ties are pulled . . .

. . . OU
raised,

• The Mannix plow, pulled by a work train and followed by a second train placing ballast, is a fairly common sight on our railroads today. To observers who saw the Pennsylvania's recent plowing operation near Wolcott, Ind., however, there was a marked departure from usual practice that was immediately apparent. Instead of a locomotive for pulling the plow there was a Pullman-Standard Winch Car—the same machine that was developed several years ago to pull the P-S Ballast Cleaner.

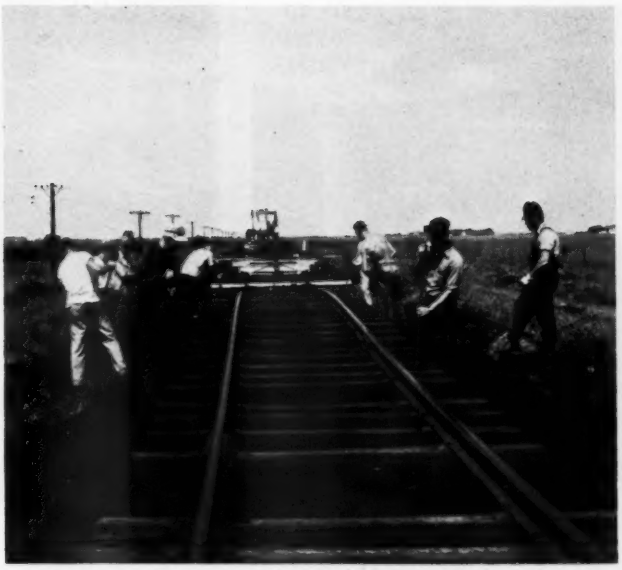
How the winch car succeeded the work train in the PRR's plowing set-up is but another chapter in the road's intensive drive to cut maintenance costs while not sacrificing quality. Just how much money is saved in the process of substitution is difficult to determine because the winch car was not adopted for plowing simply to write off the expense of a work train.

To get the most, economically, out of a plowing operation where the plow is pulled by a work train, it is imperative that the highest footage rate possible be maintained. But, PRR officers point out, use of the plow provides an ideal time to renew crossties. You merely knock the bad ties down, slide them out from under the track and slide the new ones in. Trouble is, tie renewals made in this manner, while fast and relatively easy, can't keep up with an economical rate of plow travel when you have to justify train expense, according to PRR officers.

Thus it was reasoned that the winch car might be the answer to the problem of combining economical plowing with economical tie renewals. Working in close cooperation with Pullman-Standard engineers who had seen the winch car used in plowing service on two other roads, a car was leased and given a trial run.

Team up for ▶ **Plowing track withou**usi

. . . OUT and dragged to side of roadbed. Meanwhile, with track still raised, new ties are pulled . . .



. . . IN, plates are applied and ties are properly spaced. Spikers follow after track is again on the ground.

Instead of using the conventional flat car to which are normally attached the cables from the plow and work train, the road converted a standard push car to this service. The cable from the winch car, functioning as a 2-part line, passes around a large pulley attached to the push car. A laterally adjustable drawbar attached to the other side of the car is connected to the cables which pull the plow. In addition to serving in its intermediate towing capacity, the push car serves as a handy carrier for hand tools, extra spikes, tie plates, etc.

In the case of the Pennsylvania's operation, the plowing and tie-renewal gang consisted of 33 trackmen, five machine operators, one foreman and one assistant foreman. One machine operator runs the winch car, another operates a power jack (used when necessary for installing or shifting new ties), two others bore the new ties to receive the spikes and the fifth operates the on-track compressor that furnishes air for driving spikes.

How they do it

In practice, the winch car is run out ahead of the plow, playing out cable in the process. The winch car is then clamped to the rail with its self-contained hydraulic clamps. The winch then draws the plow toward itself at a speed determined by the tie-renewal rate. Said H. E. Simmons, supervisor of methods and cost control for the PRR at Chicago: "We found that the tie renewals governed the pace of the plow and that footage had very little to do with resultant production. In other words, we could handle around 500 tie renewals a day and the footage covered with the plow was dependent on this."

Using double-track plow, too

The Pullman-Standard Winch Car is being used also to pull the Manix double-track plow that was described in the October 1956 issue of **RT&S.** The operation was the same as with the single-track procedure with but two exceptions: One man was added to the gang to operate the double-track lining device; and a three-part towing line was used instead of the two-part line. This practice, the road points out, is "still in the trial period."

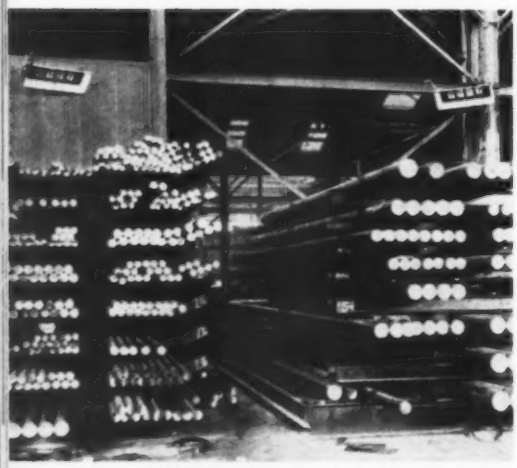
On this one operation, the plow was followed, at some distance, by the ballast train to which were assigned six trackmen supervised by a foreman or assistant foreman. These men normally assist with tie renewals until the plow has opened up a stretch long enough to drag ballast. Following the ballast train, a gang of eight trackmen, four machine operators, one foreman and one assistant foreman, raised the track using a Nordberg Power Jack, a Pullman-Standard Power Ballaster, a Nordberg Trakliner and a Kershaw Ballast Regulator. The track was lined with the aid of a lining scope.

For this particular stretch of single track, the fouled cinder ballast was replaced with slag. During periods when trains were detoured around the operation, the gangs averaged 2,930 ft of track plowed per day with 479 tie installations. When trains were not detoured, the average was 2,113 ft plowed per day with 327 tie renewals.

According to the road's M/W officers, the winch car-plow combination has definite advantages. Said Mr. Simmons: "The biggest advantage in the use of the Pullman-Standard Winch Car was that the work load for each job was spread over the entire day and very few men were reassigned or changed positions during the day."

ou using a work train

TYPICAL INSTALLATION (above) shows "rayheads" mounted within reflector. Heating costs in this shop (right) were cut an average of about $36 per month when infra-red units were installed.



ANGLE-MOUNTED units in this warehouse operate three hours each night to check condensation on steel stock.

PROPANE GAS is used in this installation. Claimed savings show 50 per cent cut in costs over oil-fired hot-water system.

In large buildings | How to place heat w

Heating large buildings, such as high-bay diesel shops, has always been a problem. Now, it appears, economical and efficient heating can be obtained through infra-red radiation. It doesn't heat the air—just objects and people.

• Radiant heating—which heats surfaces and people directly, rather than by convection from warm air—is recognized as having advantages for use in large buildings. Extensive use has been made of radiant heating wherein the heating elements—pipes and/or coils—are imbedded in walls or floors which act as radiators.

A relatively new form of radiant heating which incorporates infra-red radiation has now been developed. Heating technologists have long recognized the advantages of this type of heating. Until recently, however, they have failed to capitalize on it. They had, prior to 1956, been stymied in perfecting a simple, efficient gas infra-red generator. The chief problem lay in the fact that the generators' comparatively low operating temperatures did not produce infra-red of sufficient intensity. These early units utilized a standard gas burner to heat metal strips, tubes or louvres which emit infra-red energy.

A new approach to gas infra-red generation by a German scientist, Guenther Schwank, has promised a solution to this problem. Generators based upon his invention were brought to the United States in 1956 and are now being made here under license agreements. The Schwank technique differs markedly from previous gas infra-red generators. One stage in the earlier generation process is bypassed completely by using the structure which supports combustion as the infra-red emitter. Thus, no metal strips, tubes or louvres are needed. Higher operating temperatures are feasible and a maximum proportion of the Btu input is converted into usable infra-red radiation.

An operating temperature of 1650 deg F is achieved in the Schwank generator by combustion of gas on the surface of a patented ceramic mat. Each ceramic unit is perforated with 200 holes per square inch through which is fed an air-gas mixture. The large number of holes and the physical characteristics of the ceramic material make possible the relatively high surface temperature achieved. Because gas is converted into infra-red energy in the wave lengths readily absorbed by most common ma-

at where it is needed

terials, the generator is highly efficient and economical, according to the manufacturer, Precision Industries, division of Hupp Corporation, Cleveland, Ohio.

Conventional calculations for determining the amount of heat required for "comfort" heating of a building are not applicable to infra-red. Its rays, like those of the sun, warm only the bodies which absorb them and not the air through which they travel. Once the energy waves emitted by the gas generator strike a person, wall, floor or piece of machinery in their path, they are transformed into heat.

The feeling of warmth created by infra-red energy can be illustrated by stepping from the shade into sunlight on a cool day. The body is warmed instantly while the air remains cool. In an infra-red heated building, a person is warmed by radiation from the generator and by radiation, conduction and convection from the floor-wall-machinery surfaces, which become radiators themselves. Workmen don't experience a sharp change in air temperature when they go outside or into unheated areas of the plant. Tools, machinery and materials are always warm to the touch.

Because infra-red heat requirements are calculated in square feet instead of cubic feet, no single yardstick can be used to compare performance with conventional space heaters, says the manufacturer. "Generally," says C. H. Foulds, vice-president, Perfection Industries, "gas-fired infra-red can lower heating costs by 20 per cent in a building easily heated by other methods. In hard-to-heat buildings, heating costs can be reduced up to 50 per cent. In addition, infra-red can provide spot heat in warehouses or other unheated buildings as well as at loading docks and other partially exposed areas." The infra-red generators can be installed at any height as low as 7 ft and as high as 60 ft without sacrifice in efficiency. Sidewall mounting of infra-red generators is also possible.

Operation of the new infra-red generator on natural, manufactured or liquified petroleum gas is extremely simple, says the manufacturer. Gas is metered through an orifice, then passes through an air aspirating chamber and a mixing tube to a chamber under the ceramic mat where it is distributed uniformly through the ceramic.

U.S.-designed gas generators based on the Schwank principle are multiples of an eight-ceramic combination called a "rayhead." These rayheads are grouped in an aluminum reflector which helps direct infra-red toward the surfaces to be heated. For installation in high-bay buildings, a large number of rayheads are combined in the same fixture to radiate over a large area.

Generator models for indoor use have been approved by Underwriters Laboratories and the American Gas Association. Zone thermostats are normally used. They are hidden from the rays of the generator so that heat rising from the floor controls the temperature. "Life expectancy of the unit under normal service conditions," according to Mr. Foulds, "is unlimited, with adjustments and repairs seldom, if ever, necessary."

Installations of the gas infra-red generator in the U.S. today include factories, foundries, warehouses and car-thawing applications. One such installation consisted of a portable over-deck generator at a one-man station in a large otherwise unheated steel warehouse. The car-thawing application was made at the Toledo Lakefront Dock (see *RT&S*, September 1957, p. 62).

What is infra-red?

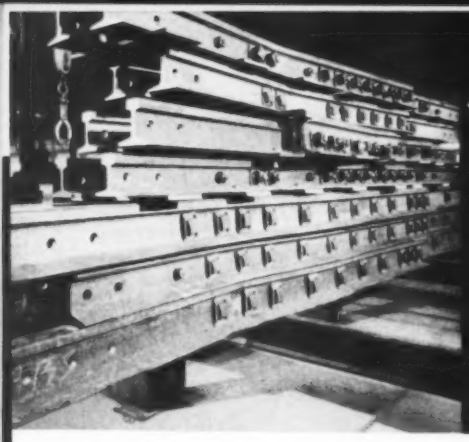
Infra-red rays have wave lengths longer than those of visible light and shorter than radio waves. They are waves of energy produced by the sun, a fire or by a heated object. Infra-red waves are a member of the electromagnetic family of waves. All members of this family have the same characteristics.

1. They all travel in straight lines at 186,000 miles per second. They do not affect the bodies through which they pass—only those which absorb them.

2. They can be reflected with mirrors and focused with lenses.

Light is often described by its color. Infra-red is described in a similar manner as "far" infra-red and "near" infra-red. Near infra-red comes from that part of the spectrum nearest to light. Near infra-red which is produced by conventional infra-red electric bulbs does not have as great heat strength as far infra-red because much of the energy is light.

Far infra-red is produced by lower temperature sources than near infra-red. The gas technique described on these pages converts most of its fuel into far infra-red energy in wave lengths readily absorbed by most common materials.

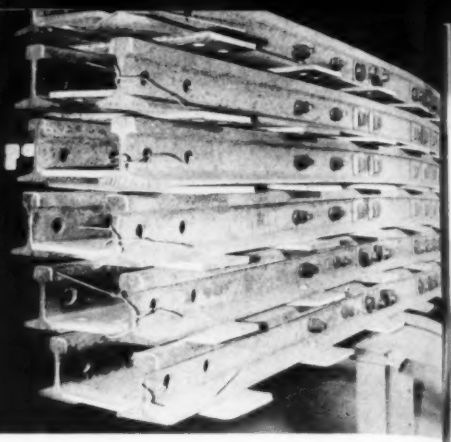


Variety or Simplicity

FROGS

Variety. These rigid frogs are typical of the many varieties of frog design used by the railroads today. Their mechanical designs vary widely — some are self-guarded, some are not; all vary in size and punching of the plates, length, rail section and other details that obviate mass-production and lower costs.

Simplicity. Shown for contrast rather than a recommendation of design, this stack of rigid frogs of the same type symbolize the simplicity of having standardized designs for trackwork components. Eliminating the many variations in rail section and mechanical construction would enable manufacturers to utilize more mass-production techniques, thus reducing railroad costs and inventories, and speeding up delivery times, at no sacrifice in quality or usability.



Custom Trackwork . . . *a Luxury?*

Standardization could mean lower costs, quicker delivery, less inventory, improved design

In the fall of 1952 an official from a railroad that needed turnouts in a hurry saw in a Brake Shoe shipping depot stacks of finished components for a neighboring line that had no pressing need for the parts. Unfortunately, because of minor differences, the turnouts were useless to him. This was perhaps the moment that the Southwestern Standard was born.

It was not long thereafter that a group of St. Louis and Kansas City Railroads, most of whom had been buying from American Brake Shoe Company's East St. Louis plant since 1875, conferred with Brake Shoe and drew up the Southwestern Standard which is based on AREA Plans. The 115 lb and 132 lb rail sections were agreed upon as standard among the group. Once having settled the rail section the companies were able to order a number of trackwork components identical and interchangeable, including the No. 10 spring frog, the 16′-6″, the 22′, and the 30′ switch.

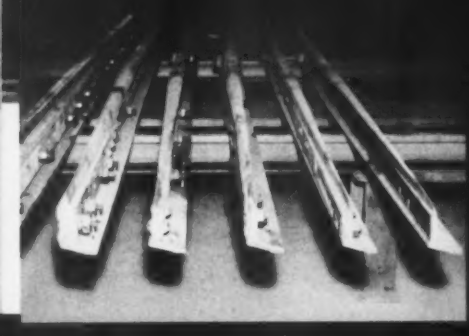
Results? While it is too early for the users of the Southwestern Standard to completely assess the advantages gained through standardization, many officials have noted that their turnout costs are less, their inventories reduced and deliveries almost immediate.

The initial users of this uniform standard were the following:

Missouri Pacific
St. Louis San Francisco
Kansas City Southern
Louisiana & Arkansas
Terminal Railroad Association of St. Louis
Kansas City Terminal
Quanah, Acme & Pacific
Galveston, Houston & Henderson

Other railroads are contemplating adopting these standards and may soon follow.

Turnout costs are significant—in a section of mainline track they average about 10% of the total track laying cost; in a yard this figure varies roughly between 25% and 40%. American Brake Shoe Company has come to the conclusion, based on many years of experience in the field of manufacturing trackwork components, that it is uneconomical for this equipment to be bought in what amounts to custom-made lots—custom-made because nearly every individual standard differs from the others, even when the same rail section is being used. Here are the reasons why we feel as we do.

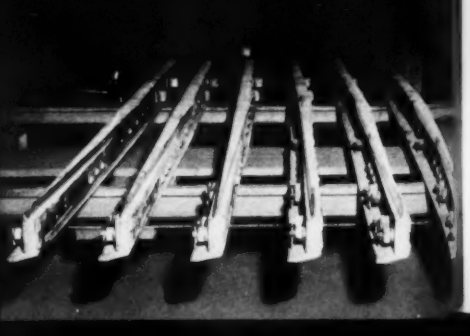


Variety or Simplicity

SWITCH POINTS

Variety. These switch points are typical of the many variations existing today in rail section and mechanical details, such as reinforcement, clearance at the point, and position of rod bolt holes.

Simplicity. On the other hand, standardizing would help clear up today's multiplicity of design. Lack of interchangeability has forced manufacturers of trackwork components to custom-make each order.



Standardization would lower costs

It is extremely difficult to forecast the amount precisely, but there are indications that savings to railroads that would be able to derive advantages from standardization would be at least 5% of present costs. How would this be accomplished? Mainly because manufacturers would be able to produce parts at lower costs, through the use of mass-production techniques maintained throughout a more stable business cycle.

Some special designs, for example, cost as much as 25% more than those based on present AREA trackwork plans. Why? For one thing, they may require set-up and planing times that are as much as 2½ times that of a standard design. Add to this the cost of a separate inventory of plates, bars, castings, and forming dies required—all of which are unusable on another standard—the extra supervisory, engineering and accounting time needed for a special item, and the picture becomes clearer. Multiply this whole complex by the number of standards that the manufacturer supplies; add to this a high labor turnover due to fluctuating business—and the savings obtainable through standardization come into even sharper focus.

The question has been raised, "Would the savings possible at the manufacturing level through standardization be passed on to the railroads?" The answer is "Yes." Lowered costs would enable manufacturers to price more competitively, thus stabilizing railroad costs at lower levels.

Would speed delivery, reduce railroad inventory

Streamlining of turnout production would also mean quicker delivery to the railroads; in fact, deliveries could often be made as fast as orders can be processed—rarely longer than 30 days. Under the present system of custom-made parts, delivery times of 120 days are not unusual.

It has been estimated that it costs the railroads at least 20% over the investment to carry finished materials, including interest, depreciation, obsolescence, storehouse costs and taxes. Standardization would help the railroads reduce their inventory of fabricated parts, and, at the same time, match delivery dates as closely as possible to anticipated dates of installation. The manufacturer would, in a sense, "carry" the inventory, since he would stock some items and deliver others on short notice.

Moreover, in extreme emergencies, neighboring railroads would be able to borrow interchangeable parts from each other. This is impossible with present standards.

Simplify trackwork operations and produce better designs

According to one railroad man, "The only thing that's standard about our standards is that they are constantly changing." Standardization would reduce engineering costs and simplify operations. The very fact that it would require industry approval for revisions would discourage trivial alterations, and thus have, as one official said, " . . . a fly wheel effect that would tend to smooth out operations."

Standardized plans would not only reduce the tendency to tinker, but they would also result in better designs. Having the experience of the entire industry focused on a standard would naturally produce a better product . . . and certainly at less cost to the individual railroads.

"But," one might ask, "wouldn't a single standard stifle development?" The answer is "No." Suggested changes to a standard would receive the benefit of objective scrutiny by the entire industry, thus fostering worthwhile developments while discouraging the trivial.

Making the transition period easy

The full benefits of standardization would not be felt by the railroads immediately—it might take perhaps five years before the minor annoyances of transition would be entirely eliminated. But the conversion need not be as difficult as it might seem at first glance. In fact, many railroads have been through it before, when they changed their own standards. For one thing, contrary to what might be expected, inventory will take a downward trend. Past experience has shown this to be true. Many opportunities to use a new design at no additional cost have been found—during the laying of new track; during relaying, where the normal tendency toward a heavier section usually requires extensive switch remodeling; and during general maintenance work, whenever obsolete turnouts are replaced. An analysis of track-laying plans would reveal many ways to make the transition to standardization relatively smooth.

How far have we gone?

The way toward standardization has been pointed out by the AREA trackwork plans. While sometimes criticized for their complexity and variety, these excellent compilations have been invaluable to railroad progress. That they are perhaps not yet a clear consistent standard—as some have maintained—can be understood in the complexity and the history of trackwork. According to many experts, simplification is needed before the AREA plans are to become entirely useful as a standard. Others feel that a complete revision of the standards, based on a sweeping study of existing needs, is necessary, and that such a study would be well worth the effort.

To what extent have the railroads used the AREA Standard? A recent survey of the major railroads has indicated that almost 50% of their existing standards are variations of the AREA plans and most of the remainder bear no resemblance to the plans—adding up to almost 100% *non*interchangeability.

Where do we go from here?

The example of the Southwestern Standard shows that standardization can be successful. Fortunately the way to wider standardization is open: the industry has its several excellent associations representing the great variety of railroad experience. We at American Brake Shoe will continue—as we have in the past—to make our services, and our wealth of experience available to the railroads in any effort to promote sound and progressive standardization. The means are at the industry's disposal; the way is open. It is time to make another move ahead.

What some users of the Southwestern Standard think.

"Since the manufacturer would be able to make quicker deliveries, the railroads can reduce inventories and not have to carry such a large stock on hand . . . In going from individual designs to standardized parts, actually there is practically no sacrifice in obtaining material which is fully capable of rendering dependable and safe service." E. F. Salisbury, Chief Engineer, K. C. S.—L & A Railway Companies.

"We would like to see an even greater amount of interchangeability. It makes economic sense . . . Nonstandard parts, due to their special nature, cause long waits for deliveries and are more expensive. Some standardized trackwork materials would normally be held in stock by various manufacturers." A. B. Chaney, Engineer Maintenance of Way, Missouri Pacific Railroad Company.

"Standardization of rail sections and turnouts—permitting mass production—will and has reflected a savings in cost and shortened delivery time. Inventory stocks can be materially reduced and a saving made in maintenance and repairs." Thomas W. Avery, Chief Engineer, Kansas City Terminal Railway.

"The conception and adoption of the Southwestern Standard has definitely lowered cost of material, improved delivery dates, reduced inventory and has produced many intangible economies." V. C. Hanna, Chief Engineer, Terminal Railroad Association.

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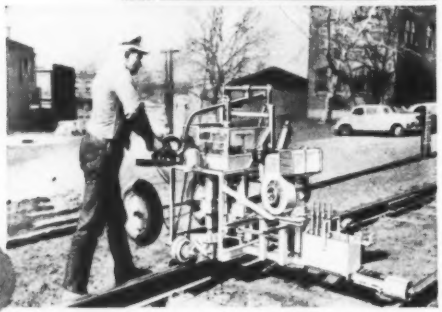
TIE DRILL



Faster Tie Drilling—Cut field drilling costs about 75% with the Nordberg Tie Drill. It's the fastest tie drill on the market—one man can drill 48 holes in 24 ties of one rail length in 2½ minutes.

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Weight 140 lbs. complete

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Length	Width	Ht. above Rail	Weight
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36 in.	14 in.	6 in.	60 lbs.

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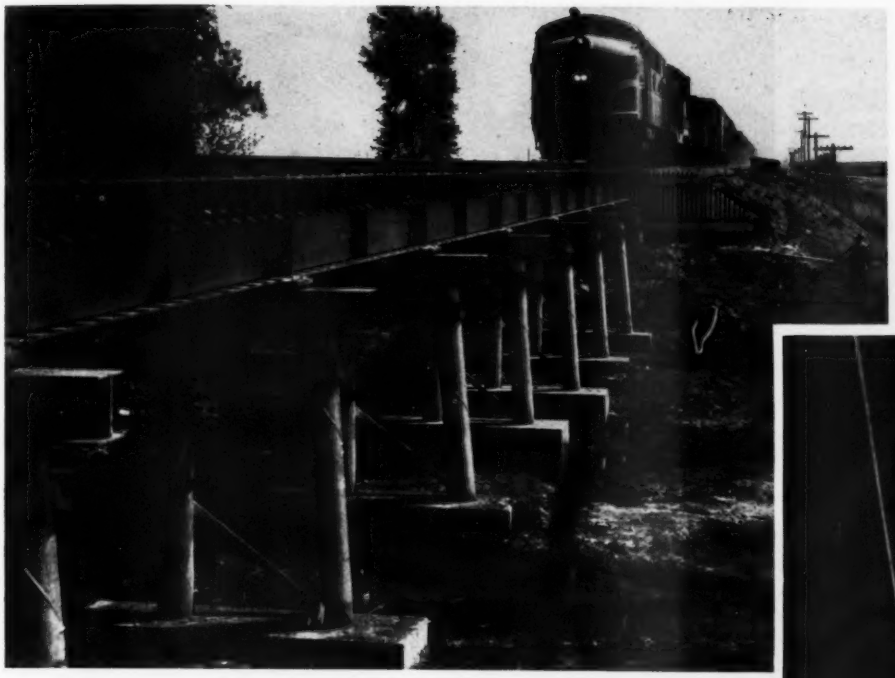

Each pile for the TP&W trestle has a diameter of 12¾ inches. Note interlocking Armco Steel Sheeting abutment wall for additional fire protection.

Close-up of finished understructure. *Arrow points* to Armco Asbestos-Bonded® drip plates for protection against brine drippings.

Armco Steel Pipe Piles *Provide Attractive, Easy-to-Maintain Trestle for T P & W*

When an old timber trestle had to be replaced near Fairbury, Illinois, the Toledo, Peoria & Western Railroad wanted a new structure that would eliminate expensive repairs and all possible fire hazards.

To solve the problem, engineers designed an 8-span, 160-foot-long trestle using Armco Steel Pipe Piling. Each bent includes three steel piles instead of the usual six-pile timber bent to provide an E-72 loading.

Other features of the trestle include steel I-beam caps and pre-assembled steel girder-spans.

The design of an all-steel structure by the TP&W resulted from a complete study of all factors, including a comparison of the railroad's experience with maintenance costs on steel bridges and timber structures.

For more photos, drawings and details on this job or complete information about Armco Foundation Piling, just mail the coupon. Armco Drainage & Metal Products, Inc., Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

ARMCO DRAINAGE & METAL PRODUCTS, INC.
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Railroad _____

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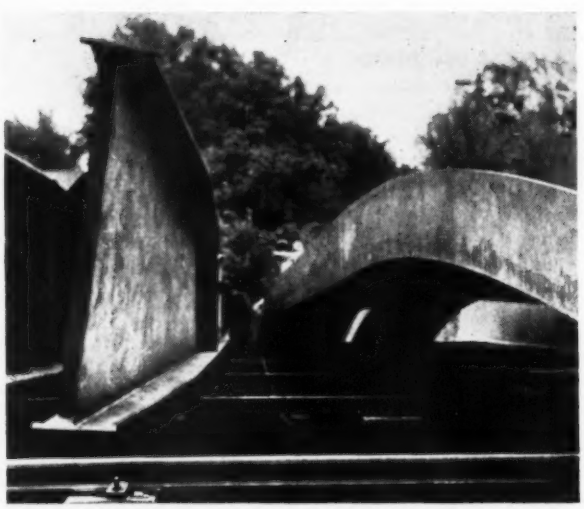
ARMCO CONSTRUCTION PRODUCTS

News briefs in pictures

POSITIVE APPROACH—Russell L. Dearmont (at rostrum in picture above), president of the Missouri Pacific, called on the railroads to embark on a program of "accentuating the positive" in an address before the Mississippi Valley Maintenance of Way Club on January 13. He was introduced by W. H. Hobbs (right), chief engineer of the MP and president of the club. Behind Mr. Dearmont is R. W. Schmidt, president and general manager, Manufacturers Railway. An audience of 300 members and guests . . .

. . . **LISTENED ATTENTIVELY** as Mr. Dearmont issued a challenge to many industry leaders who have voiced pessimism about the future of railroad passenger travel. He insisted that the public would ultimately return to rail travel between the larger cities such as St. Louis and points in the West—Southwest. The occasion on which Mr. Dearmont spoke was the club's annual "President's Night" dinner.

AN HONORABLE MENTION award was given the A. M. Byers Co. for its marketing program on wrought iron tie spacer bars for railroad bridges. The award was made by the American Metal Market, New York. An installation is shown above.



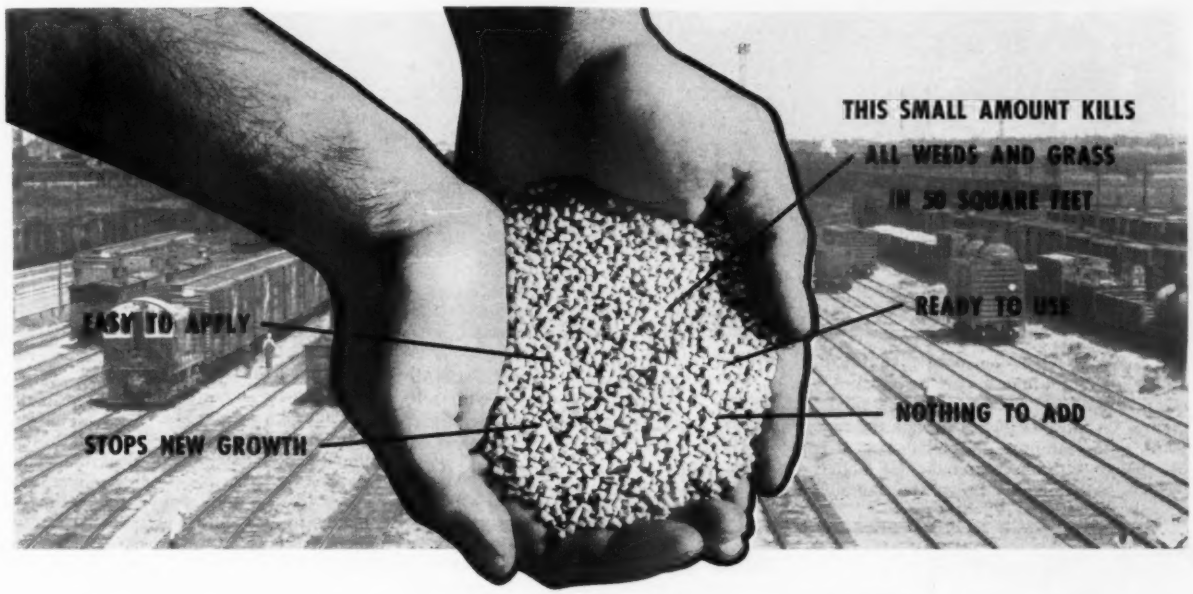
WELDED GIRDERS being erected on a highway bridge construction job were subjected to a severe test when they fell to the ground. There was considerable resultant damage in the form of bending and twisting but no failures in fillet welds.

NEW

CHLOREA®

GRANULAR

WEED & GRASS KILLER



CHLOREA GRANULAR is a new form of Chlorea weed and grass killer. The dry, dustless pellets require no mixing . . . they are ready and easy to apply with simple equipment. These advantages are combined with the powerful "kill all" effectiveness already demonstrated by Chlorea in powder and liquid forms (used on railroads for the past several years).

Here are the important facts about Chlorea Granular:

1 Kills ALL weeds and grasses . . . stops new growth for a year or more.

2 Particularly intended for use in locations where large scale spray application is impractical . . . such as freight yards, terminals, storage yards, under bridges and trestles, around warehouses, stations and other similar places.

3 Easy to use . . . may be applied with any mechanical type spreader used for granular materials; or may be broadcast by hand.

4 Low application rate . . . about 400 pounds to the acre . . . less where only annual vegetation is involved.

5 Contains 3 proven chemicals . . . this combination kills deep rooted weeds and grasses, as well as shallow-rooted grasses, weeds and annual seedling growth.

6 Is non-poisonous and does not create a fire hazard when used as directed.

CHIPMAN CHEMICAL COMPANY
Bound Brook, New Jersey

SEND FOR FREE SAMPLE PACKET

CHIPMAN CHEMICAL COMPANY, INC.
Dept. 6B, Bound Brook, N. J.

Please send free Chlorea Granular sample and bulletin.

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COMPANY _____

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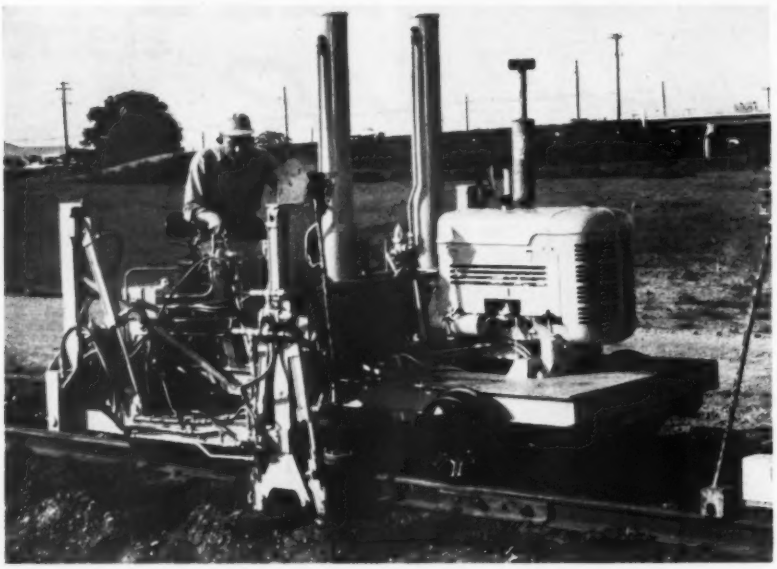
CITY _____ STATE _____

Products



New features in . . .

Super Jack-All

A NEW MODEL has been made available of the manufacturer's Jack-All. Called the Super Jack-All, the new model tamps on the side of ties outside the rails with both vibration and percussion. It is equipped with an automatic tie finder, which automatically spots the tamping heads over the ties. A self-propelled, one-man operated machine, it may be used in place of hand jacks in surfacing operations.

Other features of the Super Jack-All include a water-cooled engine with self starter, longer jacking cylinders, hydraulic brakes, and an improved set-off. *Kershaw Manufacturing Company, Dept. RTS, Montgomery, Ala.*

Higher Horsepower for . . .

New line of engines

DURING 1957, the manufacturer of the Wisconsin line of heavy-duty, air-cooled engines stepped up the horsepower range of these units from a previous high of 37 to a new top rating of 56. The latter horsepower is the rating of a new V-type, 4-cylinder engine designated the VR4D. In addition, the most powerful 4-cycle single-cylinder engine made by this manufacturer—the Model AGN, rated at 12½ hp at 3200 rpm—was introduced in 1957.

In keeping with the growing demand among original manufacturers of mechanized equipment for "more horsepower," Wisconsin engineers have also developed new internal improvements for the smaller 4-cycle, single-cylinder engines as well as for the heavy-duty, two-cylinder models, resulting, it is said, in further increases in horsepower. The Model ACN (smallest engine in the line) now has a top rating of 6 hp; the Model BKN, 7 hp; and the Model AENL, 9.2 hp, operating in the same range as previously (1600 to 3600 rpm).

The two-cylinder Models TH and THD have replaced the Models TE, TF and TFD, delivering a top of 16.4 hp for the TH and 18 hp for the THD, as compared to previous maxima of 11.2, 14.6 and 15 hp, respectively, for the two-cylinder models. *Wisconsin Motor Corporation, Dept. RTS, Milwaukee 46, Wis.*

In granular form . . .

New weed killer

A NON-SELECTIVE weed and grass killer in granular form has recently been announced. The product is called "Chlorea Granular," and is intended particularly for industrial and railroad maintenance. It is said to kill all types of vegetation and to have a long-lasting residual effect which inhibits new growth.

Chlorea Granular contains three chemicals in combination to kill deep-rooted weeds and grasses. It has prolonged soil-surface action on shallow-rooted grasses, weeds and annual seedling growth, says the manufacturer. The dry, dustless pellets can be applied with any of the various mechanical spreaders used for application of granular materials, or may be broadcast by hand. No mixing or adding is required. It is claimed that less than 1 lb will effectively treat 100 sq ft of weeds and grass. A lower rate is recommended where only annual growth is involved. Chlorea Granular is non-poisonous and does not create a fire hazard when used as directed, says the manufacturer. *Chipman Chemical Company, Inc., Dept. RTS, Bound Brook, N. J.*

Tie-plate bearing for . . .

New rail anchor

A NEW one-piece rail anchor has been introduced which is designed to bear against the tie plate. Known as the Reliance rail anchor it is made from high-carbon, high-manganese spring steel, heat-treated to obtain maximum strength consistent with a high degree of toughness. It is applied and removed with a maul or spike maul. A positive stop is said to prevent overdriving if the anchor is applied according to instructions.

Because the Reliance anchor bears against the tie plate (see photo page 25), each anchor is said to function at maximum efficiency from the moment it is applied. The design of the anchor, which, it is said, places its strongest section at the point where the greatest strength is needed, is claimed to develop holding power beyond the resistance of the tie in any type of ballast.

In-track tests have shown, it is reported, that the Reliance anchor does not cause an objectionable wear on the spikes. In fact, because the anchor holds the tie plate firmly against the spikes the wear on the spikes is said to be actually less than on spikes where the tie plate is free to rattle.

Because of its streamlined shape it is claimed that the anchor will not catch dragging equipment and will not damage the rail in case of a derailment.

The manufacturer states that the Reliance anchor has been developed after years of laboratory and in-track tests. It is reported to be in extensive use by several railroads and under test by several more. *Engineered Railway Materials, Inc., Dept. RTS, P.O. Box 506, Massillon, Ohio.*

Fusible link for . . .

Fuel filter

GREATER SAFETY in depots, work shanties, crossing-gate towers, cabooses, etc., is claimed through the use of a new fusible-link fuel filter which automatically closes off the flow of fuel to overheated stoves, heaters, furnaces, and all oil-burning heating equipment. The device is listed by the Underwriters' Laboratories, Inc., both as a fusible-link valve and as a fuel filter, and it is a combination of both. *Collis Enterprises, Inc., Dept. RTS, 327 Brunson Ave., Benton Harbor, Mich.*

Allis-Chalmers Model D motor grader maintains access road to construction area where 11 additional departure tracks are being installed. This Model D also spreads and levels fill-in areas, constructs drainage ditches, handles parking lot and yard construction and maintenance.

Put Model D economy to work on your off-track maintenance jobs

Allis-Chalmers 50-hp Model D has the right combination of weight, power and traction to give maximum efficiency and economy on a wide range of railroad maintenance and construction jobs.

The low-cost Model D, priced at only one-third the cost of a large grader, is ideal for maintaining yards, grading parking areas and roads, cutting and cleaning ditches, spreading ballast, constructing and maintaining storage areas, handling other railroad jobs.

Special attachments increase the versatility of this motor grader, eliminate the need for specialized equipment. Rear-mounted, $\frac{5}{8}$-cu-yd loader handles gravel, cinders and other bulk materials . . . hydraulic scarifier cuts $27\frac{3}{4}$-in. swath in hard surfaces. Accessories like power circle turn and front wheel lean add to the Model D's working speed and versatility.

See your Allis-Chalmers dealer. Let his railroad representative demonstrate the Model D on your off-track projects.

These Model D features give you big-grader performance on off-track work:

★ *Single member main frame insures long grader life*
★ *Husky drawbar and one-piece circle handle heavy loads*
★ *Work-boosting ROLL-AWAY moldboard for precision grading*
★ *Ground-gripping tandem drive gives more driving power . . . better traction.*
★ *Easy-to-handle controls reduce operator fatigue*

TRANSPORTATION SALES DEPARTMENT, TRACTOR GROUP, MILWAUKEE 1, WISCONSIN

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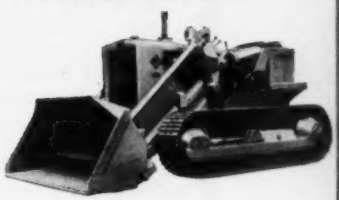
ALLIS-CHALMERS

ROLL-AWAY is an Allis-Chalmers trademark.

4 Crawler Tractors—
52 drawbar to 225 net engine hp

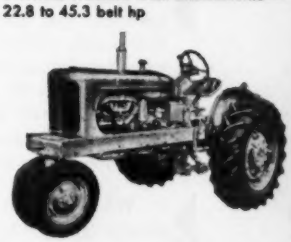
4 Tractor Shovels—
1½ to 4-cu-yd standard buckets



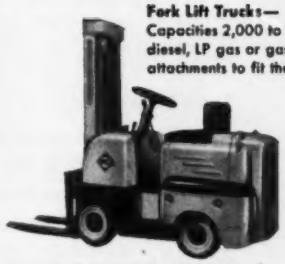
3 Motor Scrapers—
9.5, 14 and 20 cu yd heaped

2 Motor Wagons—
15-cu-yd rock wagon and
22-cu-yd bottom dump heaped

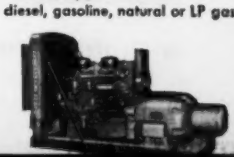
3 Wheel Tractors with attachments—
22.8 to 45.3 belt hp



Fork Lift Trucks—
Capacities 2,000 to 10,000 lb
diesel, LP gas or gasoline;
attachments to fit the job



Engines and Generating Sets—
Types for any power need,
9 to 516 hp;
diesel, gasoline, natural or LP gas



RAILWAY TRACK and STRUCTURES

What's the answer?

To be answered in May

Do you have an answer to any of the questions listed below? If so, send it in. Payment—based upon substance and length—will be made for each published answer. If you'd prefer that your name be withheld, we'll gladly comply.

DEADLINE: March 31

1. What size stone or slag ballast is most suitable for heavy-duty high-speed track? Do the light raises now being made with on-track power equipment have a bearing on this question? Explain.

2. Is the need for dolphins or protective pile clusters at bridges ever challenged when they show need for replacement? What factors determine their perpetuation?

3. Considering the high cost of labor, is there a long-range saving derived from the use of reclaimed ties in side tracks? Branches? Give consideration, in answer, to the price that would be obtained from the sale of reclaimed ties.

4. Where both passenger and lcl business has declined to a very low point, what steps can be taken to reduce maintenance of the station? Should the existing building be perpetuated or should it be replaced with some other type of structure? Explain.

5. What are the best methods of disposing of wasted fuel and lubricating oil mixed with water at diesel locomotive terminals? Explain.

Send answers to:

What's the Answer Editor
Railway Track & Structures
79 West Monroe Street
Chicago 3, Illinois

Do you have a question you'd like to have answered in these columns? If so, please send it in.

"Dry wall" for railway buildings

To what extent is it feasible to use "dry wall" interior construction in railway buildings? What are the advantages? Disadvantages? Explain.

Good for office use

By W. G. Harding
Architect
Wabash
St. Louis, Mo.

The term "dry wall" encompasses several types of building materials, such as sheet rock or plaster board, plywood, wall boards, structural fiber boards and insulating boards. In general usage, however, it applies to walls and ceilings that are covered with plaster-board units. Dry-wall interior construction is adaptable for use in railway buildings, such as offices and like structures, where it is not subject to rough treatment.

Plaster boards used in dry-wall construction are mill fabricated essentially of a fireproof gypsum core encased in a heavy manila finished paper.

Without the addition of plaster, the wall board furnishes, to interior walls and ceilings, a durable surface suitable for any type of decorative treatment repeatedly during the life of the building. Joints between adjacent panels and nail head indentations may be reinforced and/or concealed with tape and cement treatment.

Laminated wall boards are also manufactured for applications where a single thickness of material is not desirable or where building codes require greater fire-resistance ratings, such as around elevator shafts and stairwells.

Some advantages resulting from the use of dry-wall construction are: Any type of decoration or trim may be applied immediately; negligible warping or buckling due to expansion or contraction under normal atmospheric conditions; absence of moisture in walls or ceiling during construction eliminates heating to prevent freezing of plaster; material will not support combustion; and walls and ceilings are welded into units that resist cracking from vibration, minor settlement or frame movement.

Some disadvantages are: Not recommended for use where exposed to extreme or continuous moisture; must be protected against wetting when used as a base for tile; not recommended for use where subject to severe impact, mechanical wear or shock.

Almost standard practice

By A. A. Melius
Architect
Northern Pacific
St. Paul, Minn.

"Dry-wall" interior construction has been so very widely used in railway buildings that it has practically become standard practice. This type of construction has developed rapidly because of the many new materials which have been placed on the market from year to year.

Rigid insulation boards of various types present a fairly good appearance. However, they should be used only for temporary installations, or where the soft surface will not be abused.

Plywood is used extensively for temporary locations as it can be reused over and over again. With various thicknesses, as the size of the sheet and support spacing requires, permanent walls of beauty can be obtained with this material.

Hard board uses are similar to plywood. The prefinished materials present a beautiful appearance in sheets and in planks, blocks and hollow core paneling with tongue and groove joints.

Of all materials, the gypsum wall board is most frequently used. The advantages are many. The materials noted above all support combustion. Gypsum board does not. Various thicknesses provide different fire ratings. It is suitable for any type of

(*Continued on page* 50)

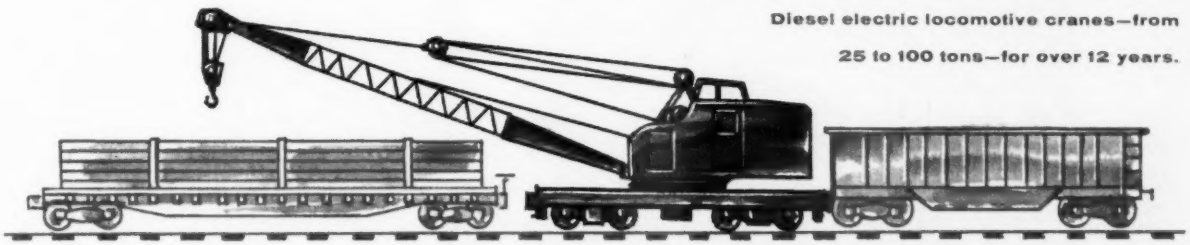
STAY ON THE RIGHT TRACK

WITH

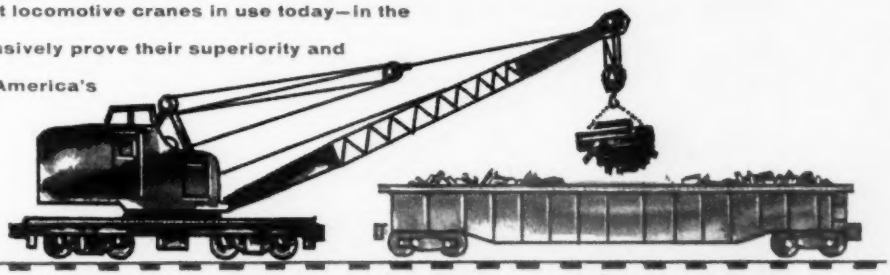
BROWNHOIST

DIESEL ELECTRIC LOCOMOTIVE CRANES

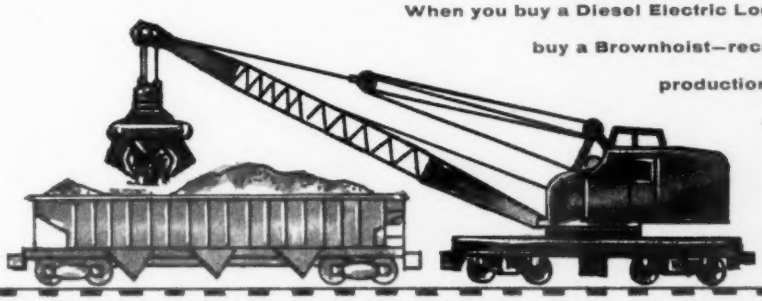
Industrial Brownhoist Corporation has been engineering and building locomotive cranes since 1873—Diesel electric locomotive cranes—from 25 to 100 tons—for over 12 years.



The thousands of Brownhoist locomotive cranes in use today—in the largest corporations—conclusively prove their superiority and their earned reputation as "America's No. 1 Locomotive Cranes."



When you buy a Diesel Electric Locomotive Crane, get the best—buy a Brownhoist—records prove their high capacity production and trouble free, economical operation. Write today for new illustrated catalog.



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BROWNHOIST

CLAMSHELL BUCKET

250 TON WRECKING CRANE

COAL-ORE BRIDGE

CAR DUMPER

LOCOMOTIVE CRANE

INDUSTRIAL BROWNHOIST CORPORATION, BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Cleveland, Chicago, San Francisco, Montreal, Canada • AGENCIES: Detroit, Birmingham, Houston

In AAR herbicidal tests...and in large-scale railroad use...

Chemical control of vegetation based on is economical and on

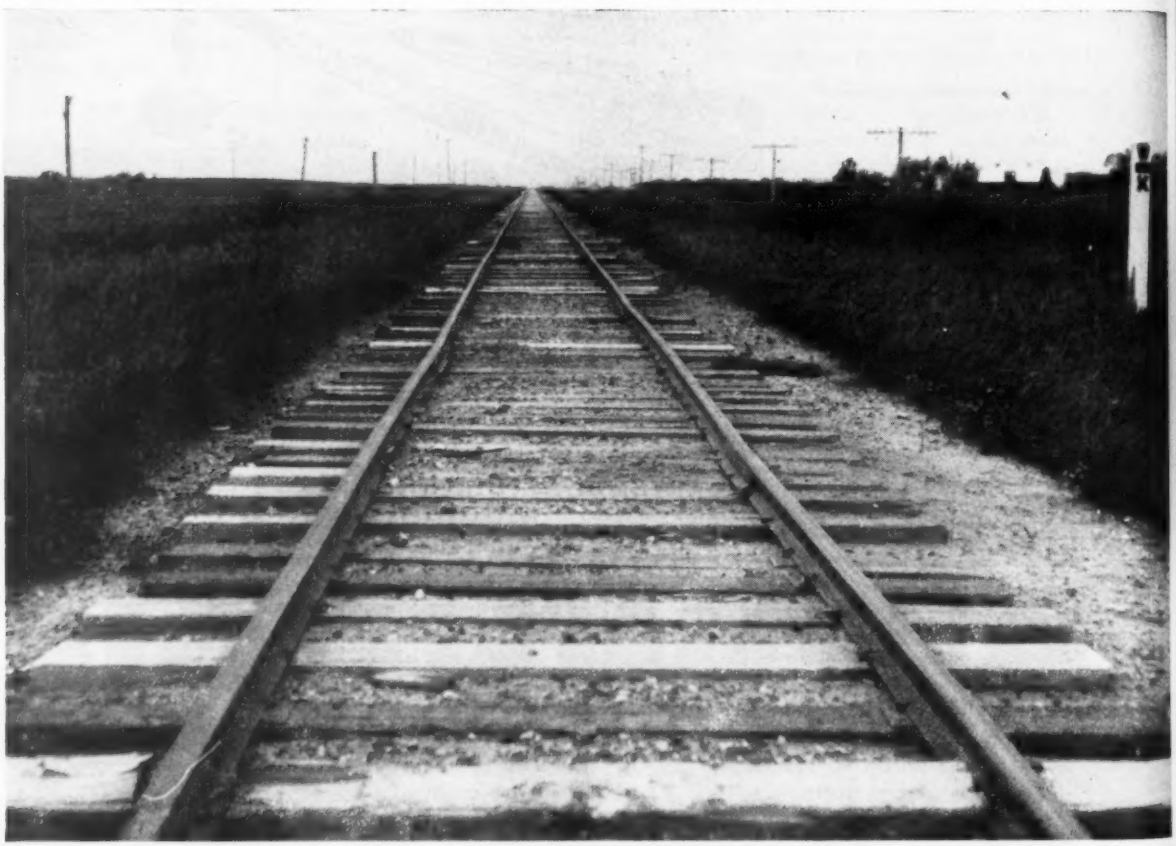
Continuing tests conducted by the Association of American Railroads indicate that the substituted urea herbicides ("Telvar" weed killers) probably show more promise of effective vegetation control than any other individual herbicide.

Few chemical herbicides, if any, excel "Telvar" in placing weed control on a maintenance basis. One application of "Telvar" controls weeds for a season or longer and, because of its highly effective residual action, reduced rates of application can often be used in succeeding years; resulting in a yearly reduction in expenditures.

When combined with other materials such as sodium chlorate or herbicidal oil, "Telvar" weed killer provides the "base" for efficiency and economy in any weed-control program. Many railroads have already found such herbicidal combinations offer quick knockdown of vegetation and long-term residual control.

"Telvar" weed killers come as wettable powders. They are non-volatile, non-corrosive, non-flammable and low in toxicity to humans and livestock. You can apply "Telvar" with your own equipment . . or your railroad applicator can do the job efficiently for you.

For long-term effectiveness and economy, be sure to include "Telvar" in your weed-control program. Du Pont specialists can help you develop the most efficient weed-control program for your needs. Write E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Dept., Wilmington 98, Delaware.



Control of native vegetation for two growing seasons resulted from treatment of "Telvar" W monuron and sodium chlorate. Application made in June 1956 on a branch line of the Great Northern R.R., Dakota Division, which runs north from Church's Ferry, N. D., to St. Johns, N. D. The photograph was taken September 1957.

...on Du Pont TELVAR® weed killers
monuron and diuron

...and long-lasting

Foreground, untreated; center, "Telvar" W monuron and sodium chlorate; background, sodium chlorate only. AAR tests, Minneapolis and St. Louis R.R., Kanawha, Ia. Applications made May 1957, photo taken September 1957.

Results like these were obtained in AAR tests on the Ft. Dodge, Des Moines and Southern R.R., Ames, Iowa. "Telvar" W monuron was applied yearly since 1953, followed by applications of herbicidal oils. Photo taken Sept. 1957.

Foreground, treated with "Telvar" W monuron and sodium chlorate: background, sodium chlorate only. AAR tests, Minneapolis and St. Louis R.R., Kanawha, Ia. Applications made May 1957, photo taken September 1957.

"Telvar" W monuron was applied in 1953, 1955 and 1957; center, check. AAR tests, Ft. Dodge, Des Moines and Southern R.R., Ames, Ia. Photo taken September 1957.

On all chemicals, follow label instructions and warnings carefully.

DU PONT
REG. U.S. PAT. OFF.

TELVAR® weed killers
monuron and diuron

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

What's the answer? (cont'd)

decorative treatment or redecoration. It is crack-resisting, non-warping and non-buckling.

All dry-wall construction materials can be economically applied by one trade from studs or joists to the final surface ready for decoration. Excessive moisture is eliminated during construction. Time is saved by continuous application and because there is no time lag before decoration.

There are some disadvantages in dry-wall construction in addition to the fire hazard. The above materials should not be used where exposure to moisture is extreme or continuous. For gypsum board, studs must be straight, as uneveness of surface presents a poor appearance.

New rail on existing tie plates

Under what conditions is it possible to lay new rail on the existing tie plates? Where this is done, should the ties be adzed? Explain.

Requires careful study

By H. J. Weccheider
Engineer Maintenance of Way
Erie
Youngstown, Ohio

The laying of new rail on existing tie plates is dependent, primarily, on their general condition. In some cases a substantial reduction in the section of the tie plate may have resulted due to ordinary wear, or corrosion from brine drip.

If the condition of the existing tie plates is questionable at the time the new rail is laid, they should be renewed. The labor cost to make such a renewal out-of-face at a later date would be extremely high and would also result in an additional period of delay to trains. However, considering the initial expenditure in new rail today, actual conditions should be studied closely so that the new rail is taken care of in the best possible manner from the start. Thus, one can realize the maximum life of the rail. Tie-plate requirements are closely associated with the added life of the rail.

There are numerous aspects, as cited below, to be considered in the laying of new rail on existing tie plates or in their out-of-face renewal when rail is laid:

(1) In locations where the new rail has a wider base than that being removed, out-of-face tie-plate renewal would be necessary.

(2) If former double-track territory has been converted into a single track and now carries tonnage comparable to that formerly carried by the two tracks, the condition and size of the tie plates would determine whether or not existing tie plates should be used.

(3) Where heavy tonnage warrants, existing tie plates less than 7½ in by 12½ in. in size, or those with a cant of less than 1 to 40, should be considered for replacement at the time the new rail is laid.

The above remarks are not meant to imply that new rail cannot be laid on old plates. There are numerous locations where a study of the tonnage carried, speed of trains and the actual condition of the existing tie plates would warrant the laying of the rail without the out-of-face renewal of tie plates except, possibly, where required on heavy curves.

Regarding the adzing of ties where new rail is laid on the existing tie plates, it would be well to consider that, if ties show excessive tie-plate cutting, or if it is necessary to shift tie plates at all to correct gage conditions, or to provide proper cant to the rail, the old tie plates should be removed and the ties adzed. Curves should be given special attention, particularly the low rail where excessive rolling out generally occurs.

Requirements for tie plates at location where new rail is to be laid should be given careful study for each particular job.

Relay on old plates

By Lee Spencer
Roadmaster (Retired)
Long Island
Scottsdale, Ariz.

Where conditions are such that true economy can be realized on a long-term basis, new rail should be relaid directly on the existing tie plates without re-adzing the ties. The existing plates, of course, must be in good condition and of adequate size to accommodate the new rail. The plates should be adequately spiked to prevent undue mechanical wear of the ties.

Any existing conditions of poor gage, resulting from prior mechanical wear, must be corrected before the new rail is laid.

This procedure, a departure from the usual new rail and replate practice, must be thoroughly investigated by M/W officers in each instance. A considerable saving can be realized through elimination of the need to purchase new plates. An often greater saving can be made, however, by eliminating the readzing operation in the rail-laying gang.

For example, consider the average, heavy-duty, high-speed track. There are 3,000 or more ties per mile. In relaying rail by the usual procedure, these 3,000 ties have to be re-adzed and the exposed wood recreosoted. To do so requires the pulling of 24,000 spikes, the purchase and application of 24,000 plugs, the cost and application of preservative and the redriving of 24,000 spikes—at least 50 per cent of them new—in new locations on the ties. Many M/W men agree that this procedure substracts from 5 to 7 years from the useful life of the tie.

Where new rail is laid without adzing, the normal tie-renewal rate will not be influenced by the rail relay. Where adzing is carried out in conjunction with the relay, tie renewals will increase from the normal due to the splitting of old ties when spikes are redriven in new locations and other abuses to the wood fibers which occur during the process of adzing the ties.

Other advantages to relaying rail on the existing plates are a reduction in man-hours per mile and track occupancy time, and the minimization of required resurfacing. If the cross level has been reasonably maintained, the only surfacing work required will be the tamping up of the few loose or slightly swinging ties which will

(*Continued on page* 54)

trim right-of-way

MAINTENANCE COSTS

with this

NEW HIGH SPEED BRUSH CUTTER!

★ Light weight plus back and shoulder carrying position reduces operator fatigue

★ Has powerful 2.8 h.p. motor designed for continuous, heavy-duty service

★ Saw arm elbow and knee joints give operator extra maneuverability and firmer footing

★ Lower-cost, easier maintenance . . . "V" belt drive

"Slash" is the word to describe what the new Southworth portable Brush Cutter does to right-of-way maintenance costs. One operator, plus this lightweight, versatile performer, does the work of eight men with brush hooks or scythes. The two big features that make this equipment so valuable are extreme maneuverability and "work horse" power. Exclusive saw arm elbow and knee joints provide easy cutting of brush, trees or limbs at any height within reach. Extra power permits cutting of trees up to 8" and larger, by notching.

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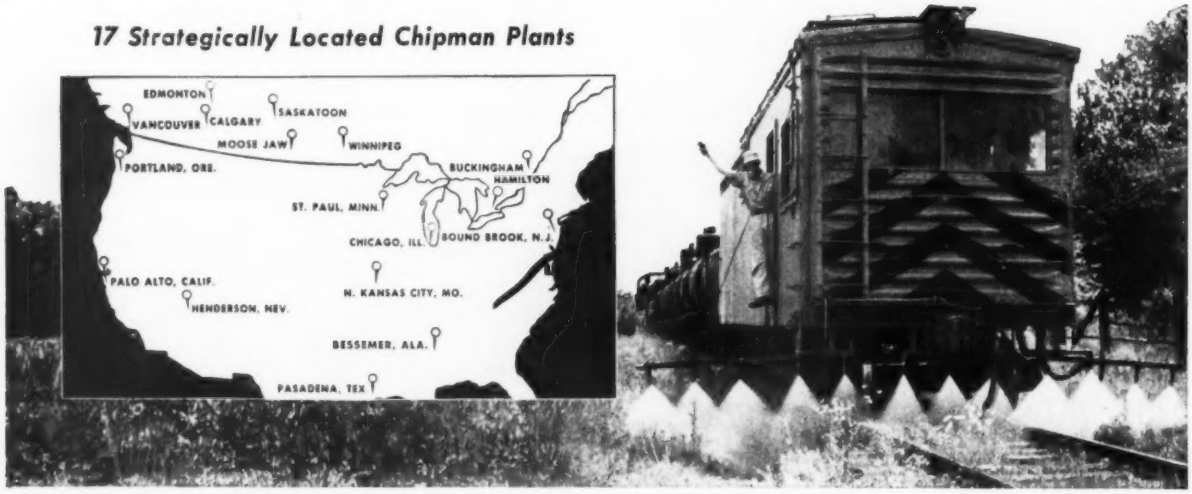

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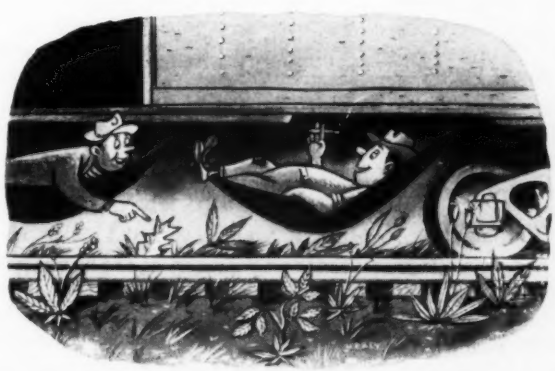

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be found in any track. Even under the worst conditions, the track will require only a "skin" lift to restore cross level and uniformity.

On at least one railroad, double-shoulder, heavy-duty, 132-lb, 14-in plates were purchased and installed under 100-lb rail. When the track was subsequently relaid with heavier rail, only one spike had to be removed to free the old rail and insert the new. To maintain gage with the lighter rail section on the 14-in plates, an adaptor was designed and installed. This adaptor was then removed when the heavier rail section was installed. The advantages of this practice were as stated above—speed of relaying and considerably less tie damage.

It is entirely practicable to relay any size rail on existing plates without re-adzing. Not only is it practicable, but it is also truly economical, all factors considered.

Welding driver burns

Where the practice is followed of repairing driver burns by welding, should the work be done as the burns occur or as a part of an out-of-face program? Explain.

Do it promptly

By F. N. Snyder
Supervisor Work Equipment & Welding
Erie
Meadville, Pa.

Where the practice is followed of repairing driver burns by welding outside the limits of the joint bars, we feel the welding should be undertaken as promptly as practical after the burns occur. There is always the possibility that progressive fractures might result under the repeated impact of wheels. If burns are left unrepaired until an out-of-face program can be set up, the fracture may have developed to a point where welding is prohibitive. Our experience indicates that where defects (cracks) are found to be ⅜ in below the top surface of the rail, the rail should be replaced.

Out-of-face program best

By C. D. Prentice
Engineer of Track
Maine Central
Portland, Me.

This should be a part of an out-of-face program to be an economical procedure. However, it should be realized that engine burns build up an excess amount of metal around one-half the perimeter of the burn, which metal is higher than the normal rail surface. This causes the wheels to skip, or jump, resulting in injurious rail impact. This excess metal should be removed with a surface grinder soon after the burn occurs. The burn can then be repaired by grinding and welding as part of an out-of-face program at a later date, unless a track district has a regularly assigned welder or rail repairman for such work.

Severe, deep driver burns must naturally have immediate special attention.

Investigate grinding, too

By W. A. Swartz
Engineer of Track
Delaware, Lackawanna & Western
Scranton, Pa.

Where the practice is followed of repairing driver burns by welding, there are several factors to consider before making a decision as to whether or not the burns should be welded as they occur, or programmed for out-of-face repair.

If the depth of the burn and the frequency of occurrence or physical location are such as to indicate an immediate liability, the burns should be welded as soon as possible. In some instances it may be more economical to replace the burned rail than to attempt to repair the burn by welding.

Where the burns are comparatively light in nature, such as sometimes occur when braking, and are in excess of 50 to the mile, an out-of-face program of welding is indicated. If an out-of-face welding program for joints has been set up, engine burns which occur in the same track location should also be programmed and welded at the same time. Lighter burns, which are scattered and few in number and which do not coincide with locations to be welded for any of the above reasons, can be welded when it is most feasible for the local welding forces to do this type of work.

We have no established physical limits as to depth of burn for determining whether burns should be welded immediately or left for out-of-face programming. This responsibility has been vested in our roadmasters after they have conducted an on-the-ground check.

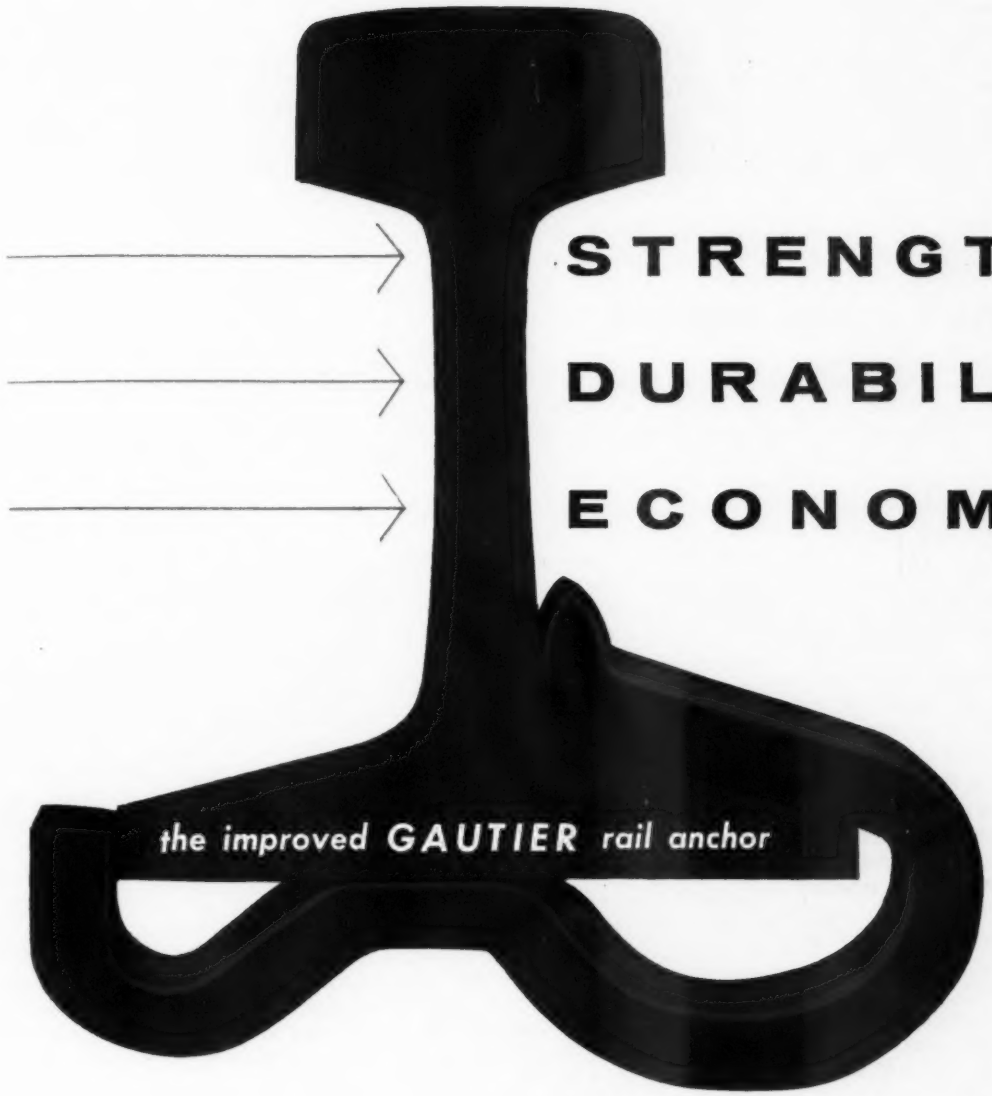
The out-of-face programming of welding of engine burns can be materially reduced, and in some instances eliminated completely, by the programmed use of a grinding train which can remove from .008 in to 0.10 in of metal per pass. Considering the increasing cost of labor and material, this practice has proven to be both feasible and economical, and may eventually replace to some extent the welding of both minor burns and joint batter.

Depends upon damage

By R. M. Baldock
Welding Engineer
Norfolk & Western
Roanoke, Va.

When driver burns are repaired by welding, the time at which this work is done should be determined to a large extent by the amount of damage to the rail. If a depression is left in the rail, the hammering due to subsequent trains will cause the ballast to be knocked out from under the tie if the burn is over a tie. If the burn is between ties, the ballast will be knocked out from under the two adjacent ties. If left long enough in either case, the rail will be kinked in a vertical plane and the condition will become worse at a progressive rate.

When such damage occurs, some of the rail is actually melted due to the heat generated by the friction between the driver and the rail. Some of the molten metal may even pile up on one side of the burn in severe cases, thereby increasing the rough



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What's the answer? (cont'd)

riding condition of the track. In any case, a glassy hard layer of metal is left on the surface, some of which may crack and spall out later. All this sets up a condition that may cause the rail to break if left long enough. In any case where a depression is left in the rail, the burn should be repaired as soon as possible.

Where a depression is not left in the rail by the burn, more time may be taken before repairing it without any bad results. This work can then be done as a part of an out-of-face program or along with the work of building up rail ends. However, if the glassy hard surface begins to crack and spall off, the burn should then be repaired as soon as possible.

How to repair bridge washouts

When a bridge is washed out or otherwise destroyed, what factors determine whether it should (a) be rebuilt immediately as a permanent structure, or (b) replaced by a temporary bridge? Explain.

Several factors involved

By R. E. Peck
Bridge Engineer
Missouri Pacific
St. Louis, Mo.

There are several factors which determine whether a bridge should be rebuilt in permanent form or replaced by a temporary structure. In the case of a bridge on an important line where traffic must be detoured, the usual practice is to build a temporary structure in order to restore service as soon as possible. Temporary construction generally involves the use of timber piling or framed timber bents and, if conditions preclude the use of this type of construction, it will usually be necessary to consider reconstruction in permanent form.

Consideration may also be given to rebuilding as a permanent structure in case the company has an alternate route which does not require the use of another railroad and can arrange to provide satisfactory stub service on both sides of the bridge. The availability of materials for permanent construction is also a factor to be considered.

Depends upon type

By C. E. O'Connor
Engineer of Bridges
New York Central
Cleveland, Ohio

While there may be justified exceptions in making decisions on the subject matter, our decision is based on: (1) Time element in getting the bridge back into service; (2) availability of materials; (3) nature, location, and size of the structure; and (4) effect on navigation and other forms of foreign traffic.

Where deck girders, rolled sections, or timber spans are involved, the structure is almost always replaced immediately with one of a permanent nature, through the use of materials available which can be adapted to the situation. However, where piers and abutments are washed out, temporary bents may be installed. If steel piling is available and used, encasement follows at a later date.

Where trusses and through girder spans are involved, the use of a temporary bridge is usually necessary—on account of the delays in getting this class of material to the site—for restoring traffic.

Where movable spans or fixed trusses over important navigation channels have to be replaced, the immediate installation almost always involves one of a permanent nature. This generally necessitates rerouting traffic over foreign lines, until the installation is completed.

Every case different

By H. Bober
Bridge & Building Engineer
Gulf, Mobile & Ohio
Mobile, Ala.

Like most engineering problems, no one answer will cover all cases. The decision should be based on the facts after a review of all pertinent information. Some of the facts to be considered are:

(1) Amount of traffic over the bridge. Where traffic is important, frequent and heavy, it is generally essential to open the line in the least time possible, so as to avoid long periods of interruption or delay of traffic and costly detours. In most cases the quickest way to replace the destroyed structure is with an open-deck pile trestle. In some cases where the structure was destroyed by fire, usually the quickest method to open the line is by cutting the old bents off just below the ground, framing timber bents on them and placing open deck in the usual manner.

(2) Character of other structures on the line. Many railroads have few or no timber structures and, for reasons of fire hazard and higher maintenance, do not want them. If such is the case, where a bridge is destroyed, it would be logical to build a timber bridge and open the line for traffic, later replacing it with a permanent structure.

(3) Characteristics of stream or other opening. If the destroyed bridge is over a stream carrying large amounts of drift or heavy ice in winter months, it would be better to use a temporary structure to get traffic moving and, as soon as plans and material are available, replace it with a permanent structure.

Sometimes considerable time in opening the line may be saved by driving the temporary trestle with only four piles per bent and placing an open deck. After the line is opened, two more piles can be driven in each bent, and the deck converted to a ballasted deck, making, in most cases, a very satisfactory bridge.

There have been some cases where a destroyed bridge has been quickly replaced by a culvert. In these days earthmoving machinery is readily available almost anywhere for the necessary fill.

Some railroads are fortunate and have a considerable stock of steel spans available, as well as steel piling, and are well equipped to handle work of this kind. If resumption of traffic at any early date is not too urgent immediate construction of a

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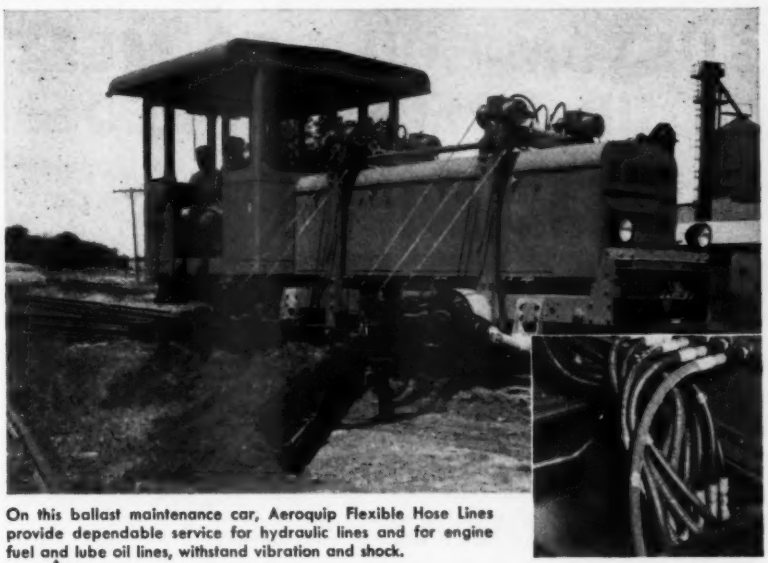

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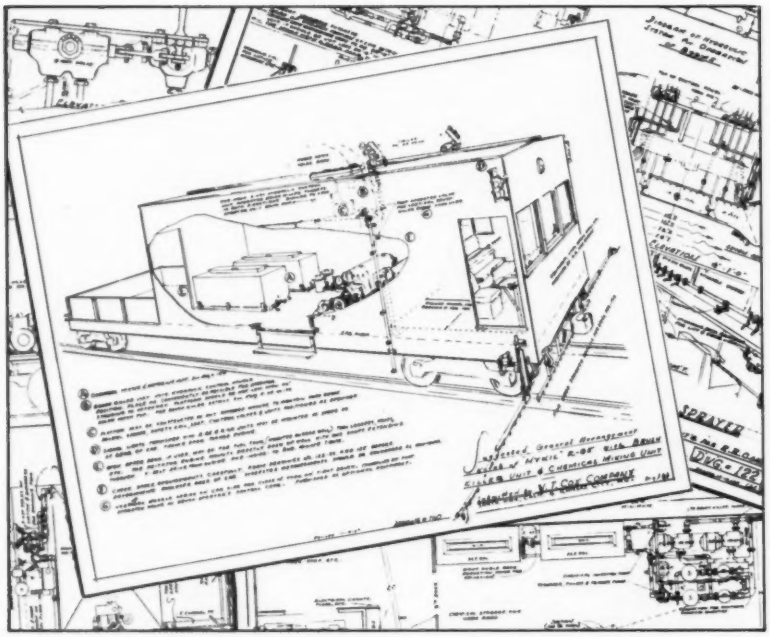

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What's the answer? (cont'd)

permanent structure may be the correct answer.

Each bridge is a problem by itself. No specific action can be recommended for all cases, but each case should be decided as the situation warrants.

Restore traffic first

By L. P. Drew
Assistant Chief Engineer
Union Pacific
Omaha, Neb.

When a bridge is washed out or destroyed by fire or other accident, the prime consideration is to restore traffic in the shortest possible time regardless of expense or final handling.

In many cases where bridges are over small streams which normally carry small amounts of water or are completely dry except during flood, a small culvert can often be placed and the entire opening filled temporarily in order to permit restoration of traffic. The permanent structure can then be built under traffic.

It is seldom, if ever, possible to replace with a permanent structure under the emergency conditions which exist at the time of a washout or burnout unless the structure can be replaced with a small culvert, material for which is available, or unless it can be redriven as a pile trestle.

Another point to be considered is whether or not traffic can be detoured at reasonable expense. If a detour is possible without serious delay, it may be advisable to construct the permanent structure immediately, assuming the delay to traffic is not too serious, and thus avoid placing the permanent structure under traffic.

Since each case is a special emergency, individual handling must be governed by conditions which prevail, such as amount and importance of traffic, the time traffic can be delayed without serious consequences and whether or not detours are available.

In some cases it might be most advantageous to build a shoofly around the damaged structure in order to get traffic moving as soon as possible. This will then permit construction of the permanent structure without traffic interference.

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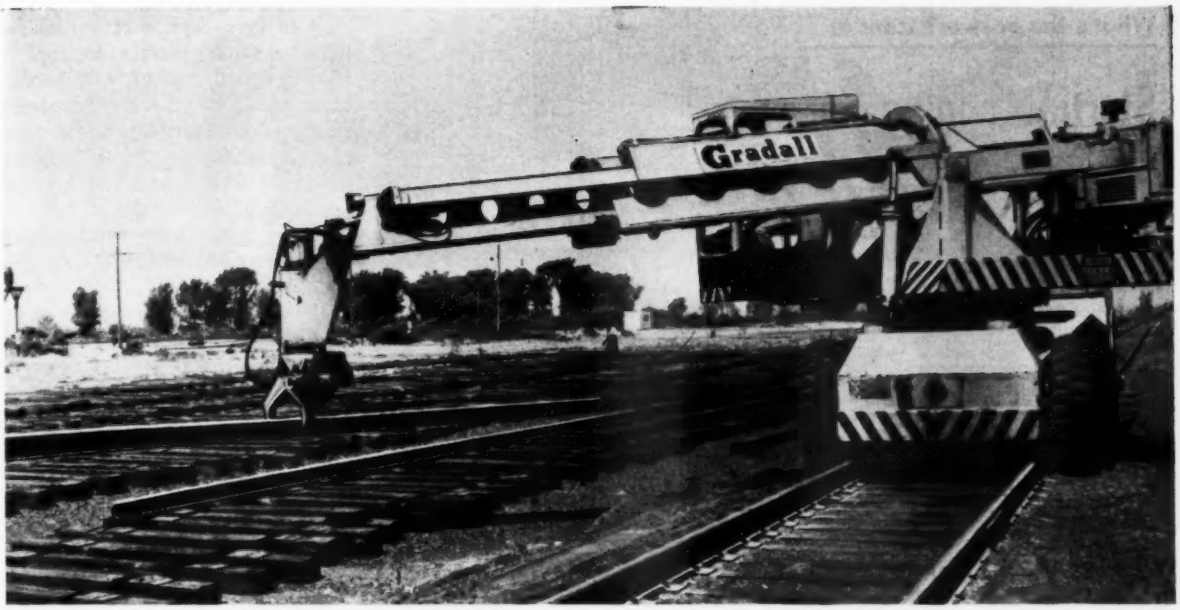

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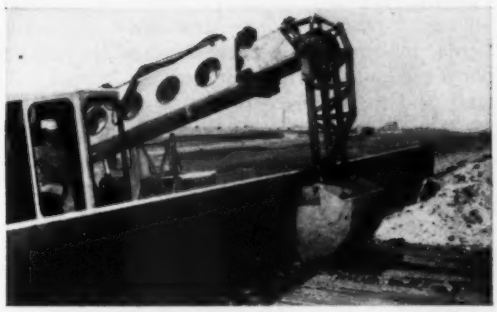

Elgin, Joliet & Eastern Railway's Gradall—equipped with a goose-neck unloading extension and 5-ft. wide bucket—quickly and economically unloads slag, sand, gravel and other materials used in M/W operations.

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What's the answer? (cont'd)

Starting engines in winter

What methods can be employed to facilitate the starting of engines of motor cars and other equipment in cold weather? Explain.

Engine condition important

By W. E. Kropp
Supervisor M/W Equipment
Lehigh Valley
Bethlehem, Pa.

The most important factor in starting engines in cold weather is to have them in the best possible condition. This means good compression in each cylinder, a fully charged battery of sufficient ampere-hour capacity, good spark plugs of proper type, good ignition wiring with tight connections, and good ignition coils, points and condensers. All ignition parts should be clean and particularly free of oil, dirt and, as far as possible, moisture, to prevent leakage or diversion of current between battery and spark plug gaps.

If magneto ignition is used, it is important that the impulse coupling is working properly and timed correctly, that ignition points are in good condition with properly spaced gaps and that special effort be made to prevent condensation inside the distributor chamber to avoid grounding or leakage of current.

Carburetors should be in best possible condition and gasoline tanks and lines should be kept clean and free of water. Refilling gasoline tanks at the end of each day prevents condensation as a full gasoline tank leaves almost no room for condensation to develop.

Crankcase oil should be as light as possible during cold weather to reduce "drag" on the starting and ignition systems which, at the same time, will facilitate best possible lubrication during the critical "warm up" period.

With the exception of ignition systems the same general rules apply to starting diesel engines, with particular emphasis on good compression in each cylinder, lightest possible crankcase oil consistent with type of operation, and having the fuel injection system in good condition.

Where practicable—and particularly when expensive machine are involved or where failure to start an engine, whether gasoline or diesel, would involve important loss of time—it is good practice to install engine heaters of which there are several types available. A 1000-watt electric immersion heater, or equivalent, connected to the engine block of an average size engine will aid in starting the engine and assure good lubrication during the important warm-up period.

Less desirable but reasonably effective aids to starting cold engines are "ether capsules" of various types, manifold heaters, etc., which will help get the engine started but which do not facilitate lubrication in any manner during the critical engine "warm-up" period.

(*More on page* 64)

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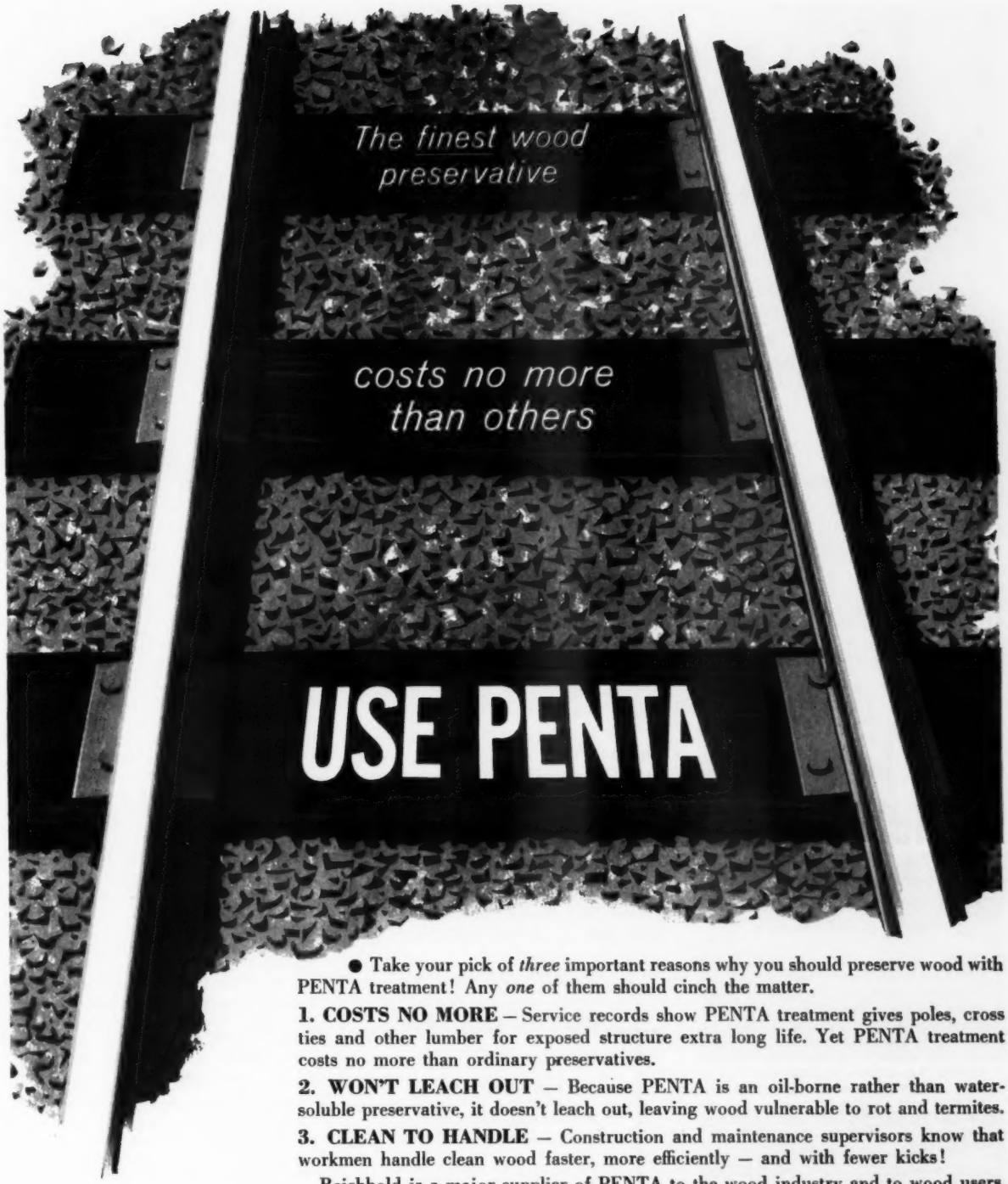

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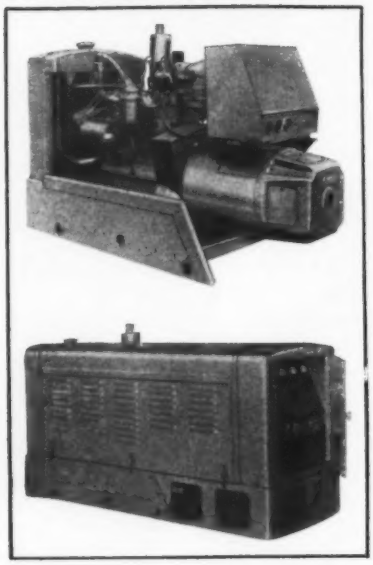
Hydrochloric Acid • Formaldehyde • Glycerine • Phthalic Anhydride • Maleic Anhydride
Sebacic Acid • Ortho-Phenylphenol • Sodium Sulfite • Pentaerythritol
Pentachlorophenol • Sodium Pentachlorophenol • Sulfuric Acid • Methanol

REICHHOLD CHEMICALS, INC., RCI BUILDING, WHITE PLAINS, N. Y.

Onan
ELECTRIC PLANTS
ELECTRIC PLANT
NEWS



Onan develops new low-cost standby plants

Water-cooled units in 10 and 15 KW sizes meet rigid requirements

A new series of water-cooled electric plants makes Onan reliability and advantages available at significantly lower prices. The new units are powered by the same rugged, industrial-type engines used on more expensive plants. They have close inherent voltage regulation, operate on either gas or gasoline, and are equipped with all necessary controls and instruments, and high water temperature cut-off. Standard Onan accessories are available.

The Onan revolving armature, all-climate generator is direct-connected and self-aligning. All standard voltages are available. Both sizes are offered unhoused or with handsome weatherproof steel housings.

Write for specifications

Onan
ELECTRIC PLANTS

D.W. ONAN & SONS INC.
3698A University Avenue S.E.
Minneapolis 14, Minnesota

What's the answer? (cont'd)

Use ether in diesels

By J. C. Moore
Superintendent of Maintenance Equipment
Southern
Charlotte, N. C.

To facilitate the starting of diesel and gasoline engines during extreme weather conditions the following practices have given good results on the Southern System:

Diesels: Ether capsules have been widely used to secure quick or fast combustion in the firing chambers of these engines. However, it is a proven fact that weights of lubricating oils have to be changed to meet these extreme operating conditions. Also, disconnecting battery cables during extremely cold weather will help in maintaining batteries at full charge during overnight or weekend storage to give a quick send-off. In addition, we are now testing an ether spray bomb which is sprayed into the intake air chambers and which appears to be potentially superior to the liquid form capsules.

Gasoline engines: Ignition systems are sprayed with an atomized quick-drying plastic which provides a protective coating against the prevailing elements such as rain, snow, water, etc. Disconnection of battery cables is also advised and lubricating oils must also be changed to meet the various temperatures. It is believed that ether should not be used on gasoline engines because lubricating values may be exceeded due to the high rpm when the engine fires off.

Do You Qualify?

Do you have—

- Technical training,
- Railway engineering, or maintenance experience,
- Ability to write clear, concise English?

If so—

You may be the man we're looking for to fill a position as associate editor on our staff. Previous editorial experience is not necessary. This job has a future for the right man. Write:

Railway Track and Structures
79 W. Monroe Street
Chicago 3, Ill.

Biographical briefs (cont'd)

(*Continued from page* 10)

railroading with the Canadian National Express in May 1939 and held various clerical and stenographic positions until 1942 when he joined the Royal Canadian Navy. He returned to CNE in 1946 as senior equipment clerk and since 1953 has worked for the CNR as assistant statistician, chief clerk and general manager, and chief accountant in the department of road transport—the latter position being the one he held at the time of his recent promotion.

Gilbert L. Wynne, 40, who was recently promoted to roadmaster on the Seaboard Air Line, at Hamlet, N. C. (*RT&S*, Oct., p. 26), joined the Seaboard in 1936 as a section laborer at Wildwood, Fla. He was promoted to apprentice foreman that same year and in April 1942 was named section foreman. After serving in the U. S. Navy from January 1942 until October 1945 he was promoted to assistant roadmaster at Tallahassee, Fla., in November 1954, which position he held at the time of his recent promotion.

John E. Sinclair, 54, who was recently named engineer terminal operations on the Canadian National at Winnipeg, Man. (*RT&S*, Oct., p. 28), attended the University of Saskatchewan and joined the CNR in 1929. After serving as chairman, rodman and draftsman on the Prince Albert division, he entered military service in 1940 as a major in the Princess Patricia Canadian Light Infantry, returning to the CNR in 1946 as an instrumentman on the Saskatoon division. Since 1952, Mr. Sinclair had been serving as assistant engineer in the maintenance of way department at Winnipeg.

Griffon P. Chandler, 29, who was recently named roadmaster on the Frisco at Enid, Okla. (*RT&S*, Nov., p. 12), graduated from the Alabama Polytechnic Institute and began railroading in April 1953 as a junior engineer on the Frisco at Springfield, Mo. From July 1954 until October 1956, he served as a student apprentice at various locations on the Frisco system and, on the latter date, was promoted to assistant roadmaster at Lawton, Okla.—the position he held at the time of his recent promotion.

Oscar W. Hawkins, 40, who was recently promoted to roadmaster on the Frisco at Chaffee, Mo. (*RT&S*, Nov., p. 12), joined the Frisco in 1936 as a section laborer and in 1939 was named assistant foreman at Oklahoma City. He subsequently served as assistant foreman on the system steel gang and as extra gang foreman on the Southwestern division until 1944 when he was named section foreman. In November 1955 he was promoted to assistant roadmaster—the position he held at the time of his recent promotion.

Robert C. Caldwell, 34, who was recently promoted to engineer of track on the Texas & Pacific at Dallas (*RT&S*, Nov., p. 12), attended Tri-State College and began railroading in April 1946 as a

RMC Tie Spacer

Hydraulic shifting devices on both sides of machine may be used independently or together to correct poor spacing and slewed tie conditions. Ties can be moved in either direction parallel to the rail. Shifting devices automatically clamp to the rail when lowered to operating position, taking all forces through the anchorage.

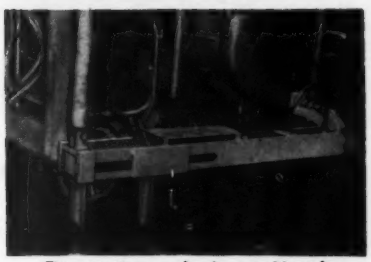
Ask for Bulletin TS-100.

Railway Maintenance Corporation

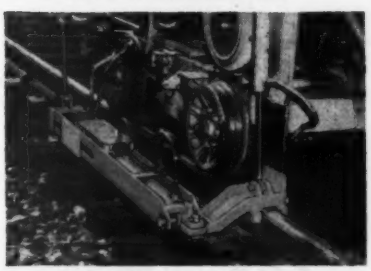
PITTSBURGH 30, PA.

RMC MEMBER

Trial and LEASE Plans



Tie engaging mechanism positioned over tie to be moved.

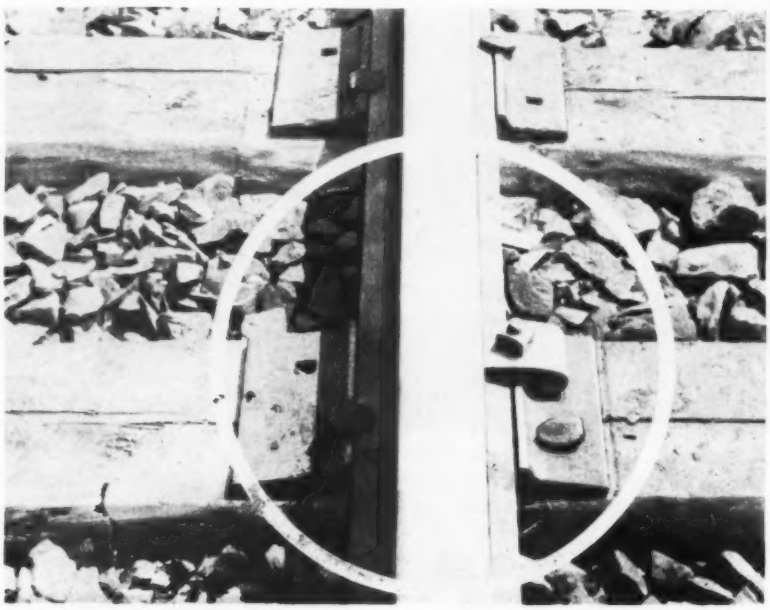


Shifting device lowered to operating position, with clamp automatically positioned on rail.

Biographical briefs (cont'd)

chainman on the Illinois Central at Flint, Ill. In September 1948 he joined the Jacksonville Terminal as an assistant engineer and was subsequently promoted to engineer maintenance of way and valuation. In April 1950 he joined the Pullman-Standard Car Manufacturing Company at Chicago as sales engineer for track equipment and was later promoted to Southwest district sales manager. In September 1954 he joined the T&P as superintendent of work equipment at Dallas—the position he held at the time of his recent promotion.

John L. Beckel, 54, who was recently named engineer of structures—system, of the New York Central at New York (*RT&S,* Dec., p. 12), graduated from the Polytechnic Institute of Brooklyn, and joined the NYC in 1929 as an assistant engineer, after having served as a designer with the Brooklyn-Manhattan Transit Corporation. In 1943 he was named bridge engineer, maintenance of way, and in 1946 was appointed special engineer in the engineering department. The following year he was named assistant engineer of structures, and in 1952 was appointed engineer of structures—Lines East. In 1956, Mr. Beckel was named bridge engineer—system.



Preferred Anchoring for "TIGHT RAIL"

Economical, low in maintenance, "tight rail" has many important advantages including reduced rail-end batter and welding. "Low joints" are minimized.

COMPRESSION Rail Anchors go hand-in-hand with this new construction providing uniform holding throughout the length of the rail.

Better get the facts, now!
Write, wire or phone for full literature

The RAILS Company

187 Maplewood Ave., Maplewood, N. J.
Offices: St. Louis, Mo., Chicago, Ill.

T. E. Jordan, 34, who was recently named district methods engineer on the New York Central at Indianapolis, Ind. (*RT&S,* Dec., p. 12), graduated from Tri-State College in 1949, and joined the NYC that same year on the engineering corps at Jersey Shore, Pa. In 1951 he was named assistant supervisor of track at Buffalo, N. Y., later being transferred to New York City as assistant industrial engineer. He was named assistant methods engineer in 1955 and in 1956 was promoted to assistant division engineer at Syracuse, N. Y. —the position he held at the time of his recent promotion.

Carl F. Thomas, 67, who recently retired as secretary and chief engineer of the Spokane, Portland & Seattle at Portland, Ore. (*RT&S,* Dec., p. 12), graduated from the University of Oregon and joined the SP&S in July, 1914, as a rodman. He subsequently served as draftsman, bridge draftsman, assistant engineer of bridges and principal assistant engineer until 1934 when he was named resident engineer. In 1942 he was appointed principal assistant engineer, and in 1946 was named secretary and chief engineer—the position he held at the time of his retirement.

Harland F. Moy, 42, who was recently named secretary and chief engineer of the Spokane, Portland & Seattle at Portland, Ore. (*RT&S,* Dec., p. 12), attended the University of Portland and Oregon State College, and joined the SP&S as a chainman in August, 1937. He subsequently served as instrumentman, inspector, engineer inspector, assistant engineer, resident engineer, and principal assistant engineer until 1955 when he was appointed assistant chief engineer—the position he held at the time of his recent promotion.

James W. Diffenderfer, 36, who has recently been named project manager in the research and development department of the Pennsylvania at Philadelphia (*RT&S,* Dec., p. 12), graduated from Bucknell University, and joined the PRR in January, 1943. At the time of his recent promotion, Mr. Diffenderfer was serving as assistant manager of passenger traffic research.

Eugene R. Bernardi, 58, who was recently named director of engineering of the New York Central System at New York (*RT&S,* Dec., p. 12), graduated from Rensselaer Polytechnic Institute, and joined the NYC in December 1923 as a chainman at New York. He subsequently served as junior engineer, designer and detailer, assistant engineer, and special engineer—all at New York—until October 31, 1952, when he was named assistant to the chief engineer at New York. On November 1, 1956, he was promoted to assistant chief engineer—the position he held at the time of his recent promotion.

Donald D. Thomas, 32, who was recently named assistant engineer of structures on the Spokane, Portland & Seattle, at Portland, Ore. (*RT&S.,* Dec., p. 12), graduated from Oregon State College and joined the SP&S as a chainman in 1945. He subsequently served as rodman, B&B carpenter, assistant roadmaster, and roadmaster, until January 1955 when he was

(*Continued on page* 69)

Because heavy traffic was a problem, this USS Quality Trackwork was heat-treated to increase hardness and toughness

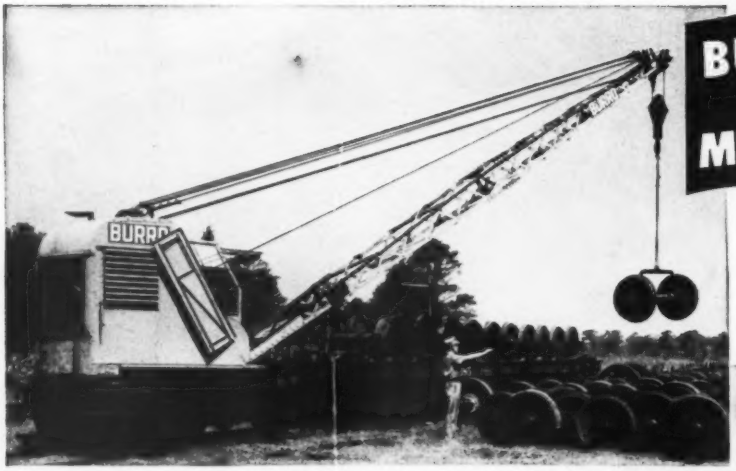
THIS CROSSING is subject to continual pounding from heavy-duty freight and high-speed passenger traffic. In the four years since its installation, there has been a noticeable reduction in maintenance costs at this location.

Heat treatment of the rails gets part of the credit. Full heat treatment not only increases hardness, and therefore resistance to wear; it also increases strength, toughness and resistance to impact. The important element in production methods developed by United States Steel to assure you of quality trackwork is *control* . . . not only of the critical heat-treating operation, but of all stages of production. Accurate control of all stages of production is possible because United States Steel is a completely integrated manufacturer of railroad trackwork.

For complete data, photographs and diagrams on the full line of USS Trackwork products, send for our free catalog, "USS Trackwork." Address your request to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa. Our engineers will be glad to advise on trackwork planning at any time.

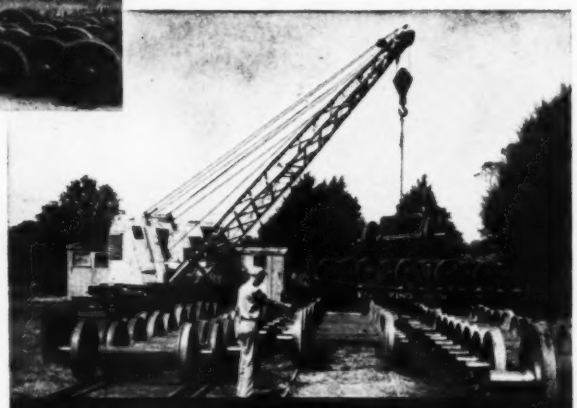
United States Steel Corporation, Pittsburgh
Columbia-Geneva Steel Division, San Francisco
Tennessee Coal & Iron Division, Fairfield, Ala.
United States Steel Export Company, New York

USS United States Steel



BURRO WORK POWER means... MORE EARNING POWER

Unloading car wheels with a Burro. The Burro moved the flat car into position and will haul it away when wheels are unloaded.



This job—handling wheel assemblies in and out of storage—won't support high costs. That's why a Burro is doing the job.

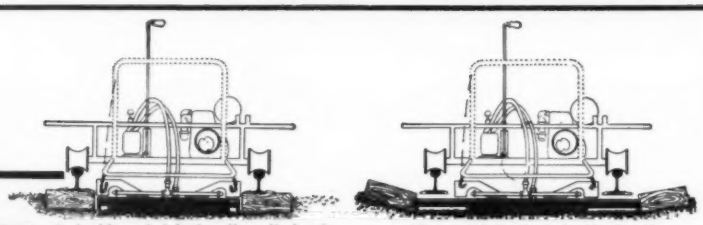
***Any* job—on the line, in the yards, or Stores Department—can be done profitably with a Burro because Burros are fast, efficient workers with hook, magnet, tongs, bucket or dragline. Fast travel speeds and heavy draw bar pull enable the Burro to go to the job in a hurry—and even haul its own cars with it!**

Write for Bulletins and more information about Burro cranes. There is no obligation.

CULLEN-FRIESTEDT CO.,
1301 S. KILBOURN AVE. CHICAGO, ILLINOIS

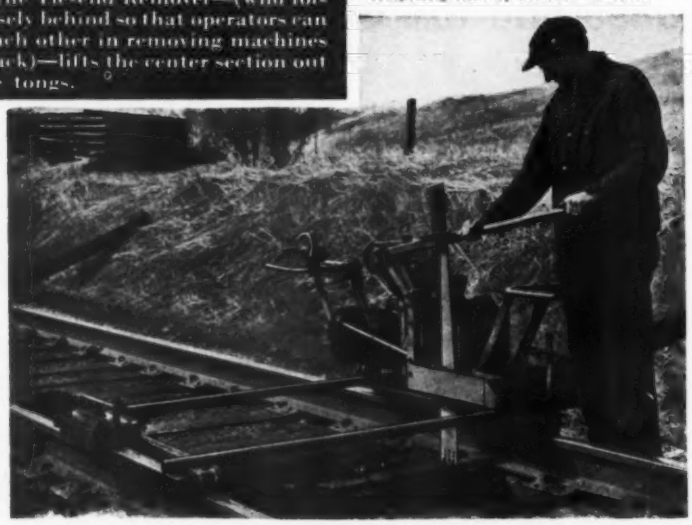
NO MORE TRENCHING!
NO MORE JACKING UP TRACK!

This WOOLERY TIE-REMOVING TEAM NOW ELIMINATES SLOW, COSTLY METHOD



A double-ended hydraulic cylinder is then lowered into the tie bed. A simple turn of the valve moves these two pistons outward, *pushing the tie-ends completely clear of the rail—whether working with single or double shoulder tie plates!* The crib is now open—and only the necessary amount of ballast is removed to admit the new tie.

After the tie has been cut on both sides by the WOOLERY Tie Cutter, the operator of the Tie-end Remover—(who follows closely behind so that operators can assist each other in removing machines from track)—lifts the center section out with tie tongs.



Use the WOOLERY TIE-END REMOVER in conjunction with the improved model NU WOOLERY TIE CUTTER! It's the *perfect team* for greater savings on tie renewals—and gives *smoother, safer track, too!*

For highest efficiency two Tie Cutters should be used ahead of one Tie End Remover.

The trend toward heavier rail and double shoulder tie plates has made removing tie-ends increasingly difficult. With the WOOLERY Tie-end Remover, this task can now be done *in less than a minute by one man with no more effort than that required to turn a valve!*

WOOLERY
MACHINE COMPANY
2919 Como Ave. S. E., Minneapolis 14

Biographical briefs (cont'd)

D. D. Thomas
SP&S

H. B. Titus
CNR

named resident engineer in charge of The Dalles dam relocation—the position he held at the time of his recent promotion.

Harrison B. Titus, 65, who recently retired as division engineer of the Canadian National at Halifax, N.S. (*RT&S*, Dec., p. 12), graduated from Mt. Allison University, and joined the CNR in 1919 as a chainman. He subsequently served as concrete inspector, instrumentman and assistant engineer. He was named division engineer of the Moncton division in June 1942 and transferred to the Halifax division in October 1949.

Simon Fogarty, Jr., 29, who was recently promoted to division engineer on the Central of Georgia at Savannah, Ga. (*RT&S*, Nov., p. 12), graduated from Clemson College and joined the CofGa in April, 1948, as an assistant engineer at Savannah. He subsequently served as assistant B&B supervisor at Macon, assistant engineer at Savannah, assistant track and B&B supervisor at Columbus, and track supervisor at Union Springs, Ala., and at Millen, Ga. In July 1957, he was named acting division engineer at Savannah—the position he held at the time of his recent promotion.

Supply Trade News

BROOKS OIL CO.—Alfred A. Paul, manager of services, has been appointed general manager of engineering sales at Cleveland, Ohio. The firm' s sales and engineering offices have been moved from Pittsburgh, Pa., to 3304 E. 87th street, Cleveland 27.

ENGINEERED RAILWAY MATERIALS, INC.— This company, with offices at Massillon, Ohio, has been formed as a partnership by **E. D. Cowlin** and **A. H. Weston.** It will handle the marketing of railway equipment and materials. At the present time these include the Reliance rail anchor, and Moore & Steele rail lubricators and other equipment. Mr. Cowlin retired last year as general manager of the Reliance Division of the Eaton Manufacturing Company. Mr. Weston retired about a year ago after serving for 27 years as eastern railroad manager of the Reliance Division.

Speedy Tournatractor can often get to an emergency area . . . do its job . . . be on its way back . . . before work-crew and gang train could be organized. Equipped with optional regulation RR coupler, unit spots suddenly-needed cars . . . pulls cars out of danger areas.

for day-in, day-out hard labor . . . or fast emergency service

You save money when you buy maintenance equipment that can do more than one job . . . with a minimum of personnel. Most maintenance-of-way machines are strictly one-purpose. But when choosing *tractors*, you have basically different types from which to select. A careful decision here can save your railroad a lot of money.

Compare Tournatractor® with any tractor. This 210 hp LeTourneau-Westinghouse unit has muscle needed for heavy dozing or push-pull jobs. It offers excellent traction — on wide, low-pressure tires — and *more* engine horsepower than the best-known crawler-tractors in its price class. At speeds over 2 mph, it matches or betters drawbar pull of any comparative crawler.

Goes anywhere . . . on or off tracks

Assets that make Tournatractor a *better* buy are *speed* and *mobility*. This machine *goes anywhere*, under its own power . . . *on* or *off* rail right-of-way . . . at speeds to 17.2 mph — 2 to 3 times the top speed of most crawlers.

What this means to you is this: When you choose Tournatractor, you get a do-it-all tractor for regular field work, plus a top-flight emergency tool *at no extra cost*. No matter *where* this unit is working, a phone or radio message sends it speeding to a washout, mountain slide, or other emergency area anywhere along your trackage.

On its way immediately . . .

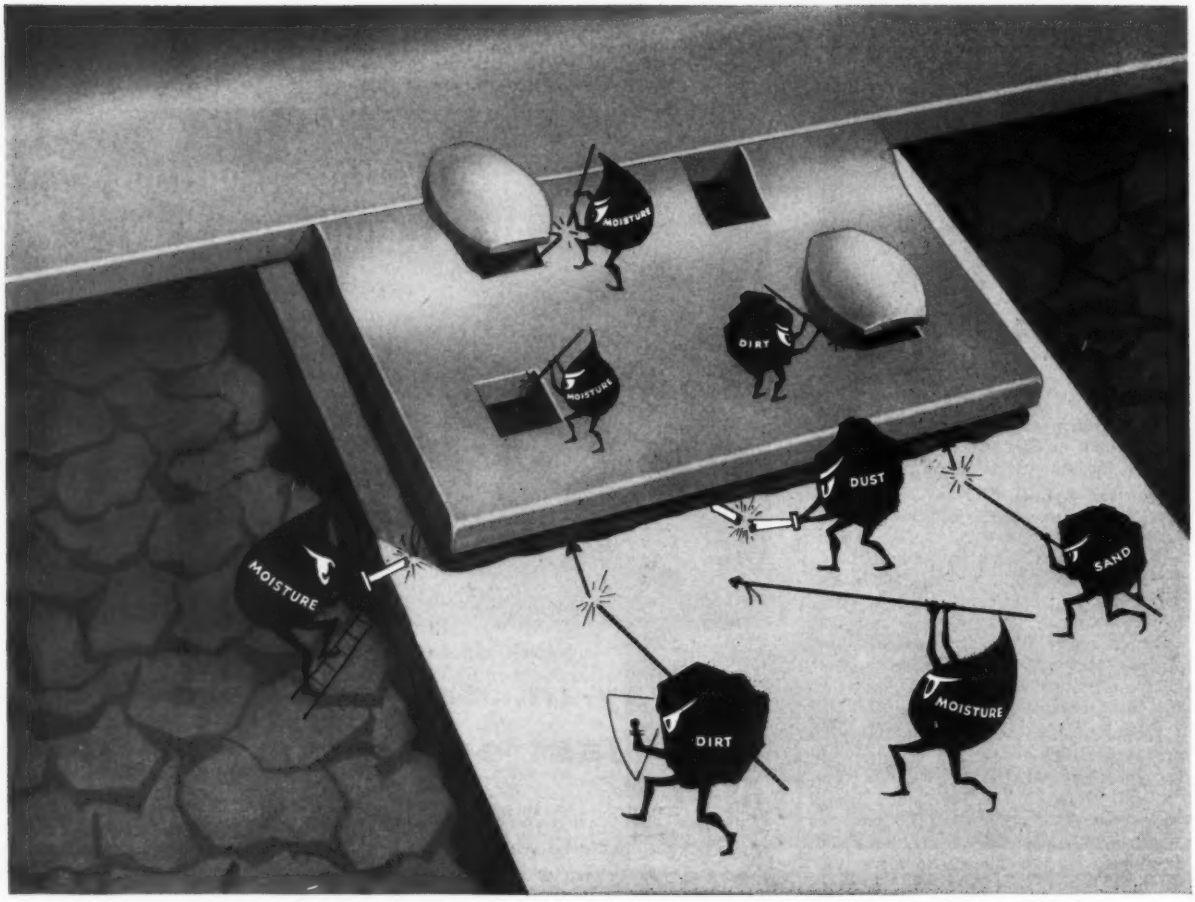
You need no trailer, flatcar, loading crew, or special planking. The operator hops on, and goes . . . via the *shortest* route. Tournatractor straddles rails, rolls along tie-ends. It crosses trestles . . . goes through tunnels, along highways, or cross-country.

Boosting its work capacity are 4-wheel drive . . . instant gear-shift with constant-mesh transmission . . . torque converter . . . 4-wheel disc-type air brakes . . . fingertip electric controls.

Let us show you how 1-man Tournatractor can do *many* of your jobs efficiently and economically. CT-1809-RR-3/5

LeTOURNEAU-WESTINGHOUSE COMPANY
Railroad Sales Division
Peoria, Illinois
A Subsidiary of Westinghouse Air Brake Company
Where quality is a habit

PRI MEMBER



Halt the charge of the Mite Brigade with BIRD SELF-SEALING TIE PADS

Bird Self-Sealing Tie Pads add years of life to your ties by positively sealing out destructive moisture and abrasive materials from the underplate area. The deadly Mite Brigade — moisture, dust, sand, dirt, grit, platform sweepings, etc. — cannot penetrate the seal. They cannot cause breakdown of the supporting power of the tie or the holding power of the spike-hole wood.

Bird Self-Sealing Tie Pads are the *only* tie pads whose durable and effective seal with the tie has been *proved* by years of in-track experience. You can slash your tie costs at least 50% with Bird Self-Sealing Tie Pads. Write for interesting booklet to Bird Tie Pads, East Walpole, Massachusetts, Department HTS-2.

Bird Self-Sealing Tie Pads are Recommended for:

BRIDGE DECKS • CURVES • SWITCH TIES • HIGHWAY GRADE CROSSINGS AND OTHER PAVED AREAS • CROSSING FROGS • INSULATED JOINTS • WITH SMALLER TIE PLATES • PILE CUTOFFS • THROUGH-STATION PLATFORMS • OUT-OF-FACE INSTALLATIONS IN RAIL-LAYING PROGRAMS • SANDY LOCATIONS • ALL OTHER AREAS WHERE TIE LIFE IS SHORT OR REPLACEMENT COSTS HIGH.

Buy the Best BIRD & SON inc. Established 1795 *Buy Bird*

Supply trade news (cont'd)

L. B. FOSTER COMPANY—This company has announced it is now storing rail, switch material, frogs and track accessories at three new stocking points in addition to its six established warehouses. The stocking points are Easton, Pa., Cincinnati, Ohio and Birmingham, Ala.

GEIGY CHEMICALS — Geigy Agricultural Chemicals, Division of Geigy Chemical Corporation, Ardsley, N. Y., announces the formation of four sales districts to facilitate nationwide distribution of its products. Coordination and supervision of overall district sales operations have been assigned to **L. G. Gammell,** assistant to the division president, **Dr. G. R. Ferguson. J. J. Hood** has been appointed assistant sales manager in charge of technical services.

The Eastern Sales District, covering the territory from Maine to Florida, has been assigned to **S. C. LeVasseur** with offices at Ardsley. **L. C. Ohle,** with offices at Kansas City, Mo., has been named district sales manager for the South Central District, which includes Colorado, Nebraska, Missouri, Tennessee and states lying south of these. The North Central District, comprising the northern section of the midwest farm states, will be in charge of **Haskell Tison,** Geneva, Ill. **C. L. Turzan,** Fresno, Calif., has been named district sales manager for all states west of the Rockies.

INDUSTRIAL BROWNHOIST CORPORATION—**Frank McBride** has been appointed district sales manager in Cleveland. Mr. McBride joined Industrial Brownhoist as a service representative in the Cleveland distrist in 1948. In 1954, he was appointed sales representative in the New York office, and a year later became sales representative in Philadelphia. Replacing Mr. McBride as sales representative in the Philadelphia office is **William D. South, Jr.** Mr. South was formerly with G. M. Merriweather Co., Inc., in Birmingham, Ala.

RALPH W. PAYNE CO.—**Robert E. Killian,** who has been with the Railroad Products divisions of the American Brake Shoe Company for the past five years has joined the firm at Washington, D.C., as sales representative.

PLUMB, TUCKETT AND PIKARSKY—**A. N. Laird,** retired chief engineer of the Grand Trunk Western, has been admitted into partnership in this firm and will be in charge of its new office in Detroit, Mich.

U. S. BORAX & CHEMICAL CORP.—**Don L. Wilhite** has been transferred to Atlanta, Ga., to be in charge of railway sales in the Southeastern part of the United States. Mr. Wilhite will be located at 1145 Peachtree street, N.E., Atlanta.

WARREN TOOL—**Bill C. Salisbury,** assistant sales manager since 1956 of the **Warren Tool Corporation,** Warren, Ohio, has been named sales manager of the company.

WELLMAN ENGINEERING COMPANY—**Carl Ludwig,** has been appointed chief engineer of the engineered products division of the

NOW

...this 115 hp grader saves you more than $1000

The low first-cost of this heavy-duty Adams* 440 grader saves you more than $1000 in out-of-pocket expense. Priced a good $1000 less than comparable 115 hp graders, "440" not only keeps your investment in M/W equipment low, but also reduces the cost of work on your rights-of-way, yards, and roads.

100% anti-friction drive. Anti-friction bearings in transmission, final drive, and tandems deliver a greater proportion of engine power to tandem wheels ... give you more push-power from 115 hp. Long bearing life cuts maintenance cost and downtime.

Big value for the money

Though economy-priced, this 115 hp full-diesel Adams is a top quality grader, complete and ready for work. Grader weighs 22,795 lbs.; is equipped with 13.00-24 tires on 4 tandem wheels, 9.00-24 on leaning front wheels. Slide-shift type 12' x 25" moldboard is operated by Adams engineered power controls that move blade at constant speed — no matter how many control levers are worked at same time. Standard equipment includes key-turn electric starting, upholstered seat, muffler, and special tools.

Extra work-power ... no added cost

You'll get up to 30% more work done with an Adams 440. Here's why:

12-speed transmission. Also, three optional creeper gears at nominal cost. With more working gears, your grader can always operate at, or near, full rpm ... develop maximum push-power at time-saving speeds. Reverse gears to 13.2 mph cut cycle-time on one-way work. Road speeds to 25.2 mph get you job-to-job with minimum lost time.

Double-action brakes. Hydraulic brakes on transmission *and* wheels stop unit faster — reduce maneuvering and turn-around time.

Rubber engine-mounts. Engine vibration is isolated from grader and operator ... to cut maintenance, adjustment, and downtime ... reduce operator fatigue; and thus increase output.

High-arch front axle. You get 24" clearance for straddling high and wide windrows of material, without bulldozing and wasting power.

Choice of engines. Select Cummins or GM 115 hp diesel ... whichever is better for your operation. This lets you standardize engines in your fleet ... for faster, easier servicing ... for maximum work-time and output.

Call or write us for details

Ask us to prove to you how an Adams 440 grader gives you extra work-power ... at a saving of more than $1000 in your M/W equipment budget.

*Trademark G-1678-RR-2/3

LeTOURNEAU-WESTINGHOUSE COMPANY
Railroad Sales Division
Peoria, Illinois
A Subsidiary of Westinghouse Air Brake Company
Where quality is a habit

MEMBER

Supply trade news (cont'd)

firm, one of the manufacturing affiliates of McDowell Company, Inc., of Cleveland, Ohio.

Association News

Maintenance of Way Club of Chicago

The February meeting of the club, which will be held on the 24th, will be addressed by J. B. Joynt, vice-president, management planning, of the New York Central. The subject will be "Hiring, Training and Appraising Employees." The meeting will be held, as usual, at the Hamilton Hotel, Chicago, with dinner starting at 6:30 pm.

Northwest Maintenance of Way Club

At the regular monthly meeting to be held on February 27, Paul D. Howard, supervisor railroad sales of the Minnesota Mining & Manufacturing Co., will present a program consisting of a color moving picture with sound dealing with the manufacture and application of the company's latest reflective products for the railroad industry. The meeting will take place, as usual, at the Midway Civic Club, 1931 University avenue, St. Paul. Dinner starts at 6:30 pm.

American Railway Engineering Association

The annual convention will be held at the Sherman Hotel, Chicago, March 11-13. It will be accompanied by an extensive exhibit sponsored by the National Railway Appliances Association. To be held at the Coliseum, the exhibit will start on March 10 and will extend through the AREA convention. Here is a skeleton program of the convention:

Tuesday, March 11
(Grand Ballroom, 9:30-12:00)

Address by President McBrian
Report of Secretary and Treasurer
Keynote address by Wm. T. Faricy, Chairman of Board and Chief Executive Officer, AAR
Presentation of Honorary Membership Certificates
Address by G. M. Magee, Director of Engineering Research, AAR

(Grand Ballroom, 2:00-5:00)

Reports of Committees
20—Contract Forms (special feature)
11—Records and Accounts
14—Yards and Terminals (special feature)
16—Economics of Railway Location and Operation (special feature)
25—Waterways and Harbors
9—Highways (special feature)

Wednesday, March 12
(George Bernard Shaw Room, 9:00-12:00)

Reports of Committees
13—Water, Oil and Sanitation Services (special feature)
24—Cooperative Relations with Universities (special feature)
7—Wood Bridges and Trestles
30—Impact and Bridge Stresses
8—Masonry (special feature)
15—Iron and Steel Structures (special feature)
28—Clearances

ASSOCIATION LUNCHEON,
12:00 Noon
(Grand Ballroom)

Presentation of gavels to new committee chairman
Announcement of results of election of officers
Address by G. B. Aydelott, President, Denver & Rio Grande Western

(George Bernard Shaw Room, 2:30-5:05)

Reports of Committees
29—Waterproofing
17—Wood Preservation
6—Buildings
Address by R. G. May, Vice President, Operations and Maintenance Department, AAR
27—Maintenance of Way Work Equipment
22—Economics of Railway Labor (2 special features)
3—Ties

Thursday, March 13
(Grand Ballroom, 9:00-12:00)

Reports of Committees
Special Committee on Continuous Welded Rail (special feature)
4—Rail (3 special features)
5—Track
1—Roadway and Ballast (special feature)
Closing business session
Installation of officers

NRAA exhibit to occupy all space in Coliseum

All available space in Chicago's Coliseum will be occupied by exhibitors participating in the 37th exhibition of the National Railway Appliances Association. The exhibition will be held March 10-13 during the annual convention of the AREA which will be in progress at the Hotel Sherman, March 11-13.

The exhibit will be open from 9 am to 5 pm Monday to Wednesday, March 10-12, and from 9 am to closing time at 1 pm on Thursday, March 13. Since the show will be open on March 10, AREA members arriving in Chicago on that day will have an opportunity to inspect the exhibit in a leisurely manner before the convention sessions get under way. For the convenience of those who wish to view the exhibits, and to save their time, the NRAA will provide free bus service on a frequent schedule between the Hotel Sherman and the Coliseum.

A total of 113 manufacturers will take part in the exhibit. Many of the displays will show devices in operation under simulated conditions as found in actual service. Fire regulations prevent the use of gas-powered units inside the Coliseum, but many such machines will be driven electrically for exhibit purposes.

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